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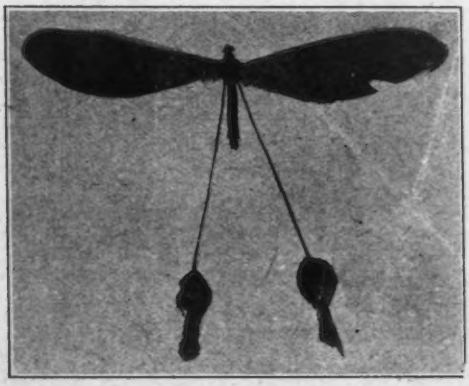

Halter americana Cockerell.

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ENTOMOLOGICAL NEWS

AND

PROCEEDINGS OF THE ENTOMOLOGICAL SECTION

ACADEMY OF NATURAL SCIENCES, PHILADELPHIA.

VOL. XIX. DECEMBER, 1908. NO. 10.

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JAMES FLETCHER, LL.D.

(Plate XIX)

Dr. Fletcher died in the Royal Victoria hospital, Montreal on November 8th, following a surgical operation. He was born in Ash, Kent, England, March 28, 1852. His education was obtained at the King's School, Rochester, England. He came to America when a young man as a junior officer in the Bank of British North America, and soon began to devote his leisure hours to the study of insects and plants. Finding the work of a bank by no means congenial to his literary and scientific tastes, he obtained a position as assistant in the Library of Parliament at Ottawa. It was not long before his talents and attainments in botany and entomology became widely known, chiefly through his contributions to the "Canadian Entomologist" and the annual reports of the Entomological Society of Ontario. His first paper in the latter was an article on Canadian Buprestidae, which was published in 1878, while his first contribution to the former appeared in January, 1880. During all the years that have followed no volume of either publication has been issued without some valuable articles from his pen.

In 1878 he became a member of the Council of the Entomo-

logical Society of Ontario, and every year since he has been elected to hold some office in the Society, being four times vice-president, and for three years, 1886-88, president. In 1879 he was one of the originators of the Ottawa Field Naturalists' Club, the most successful society of the kind in the Dominion, and more recently he suggested and by his influence and energy accomplished the promotion of the important Association of Economic Entomologists of North America.

The first official recognition of his attainments was in 1885, when he was appointed Honorary Entomologist to the Department of Agriculture at Ottawa, and in that capacity, though much hampered by his duties in the Library of Parliament, he published a valuable report on the injurious insects of the year. Two years later the position of Entomologist and Botanist to the Experimental Farms of the Dominion was conferred upon him.

In the years that have gone by, he has done an enormous amount of valuable work, as shown in his annual reports and evidence before the standing committee of the House of Commons on Agriculture, his voluminous correspondence with farmers all over the Dominion, and his addresses to Farmers' Institutes and other gatherings.

No one in Canada has done so much to instruct the people in a practical knowledge of the worst insect foes and the best methods of dealing with them, while probably no one but he could have given the Province of Manitoba the information and advice that he has repeatedly afforded by his lectures, addresses and publications on the noxious weeds of that portion of the Dominion.

He was given the honorary degree of Doctor of Laws by Queens College and was a fellow of the American Association for the Advancement of Science; fellow of the Canadian Royal Society; fellow of the London Linnean Society and of the Entomological Society of America. He was first vice-president of the latter Society in 1907 and took a great interest in its formation. In 1891 he was the president of the Association of Economic Entomologists and always took an active part in its affairs.

Dr. Fletcher was a remarkable man in many ways and the word great expresses what he has done to encourage and teach the value of economic entomology and botany in the Dominion of Canada. He had a contagious enthusiasm and kept up the interest of a host of correspondents by aiding them in every way in his power. He was an excellent and lucid teacher, a lecturer of unusual ability and a graceful writer. His name was a household word among entomologists not only in Canada, but throughout North America, and in many parts of the world besides. He traveled extensively and had a large acquaintance wherever he went, and made many trips across the continent, collecting principally along the line of the Canadian Pacific Railway. He was a large and handsome man of commanding presence and had the love and respect of a host of friends and admirers. His loss will be keenly felt and our only consolation is the thought that his grand work and example will live and be a beacon light to those that follow. He leaves a widow and two daughters one of whom is married.

DR. FRANCIS HUNTINGTON SNOW.*

In the year 1866 there came to the University of Kansas from Williams college a young man of twenty-six, full of enthusiasm, eager to do his part in the upbuilding of the school then beginning its first year's work, and pleased with the freshness and beauty of the new country. He spent the remainder of his life in the service of the institution and the state which he had thus early adopted as his own. For forty-two years he gave the best that was in him to this service which, for ten years, called him from his scientific pursuits to the Chancellor's chair. In this position, through a lean and trying period, he guided the destinies of the state university during its transition stage from a small college to a university.

In no uncertain way he thus gave directly from his life, for the irksomeness of the administrative work finally undermined his health and he was obliged to resign his position at the

*Born at Fitchburg, Mass., June 29, 1840.

head of the school. After some months' rest he returned to his old school work and for five years was happily engaged in the scholarly pursuits which he so much loved. But the old injury to his health was too severe to be overcome and again he was forced to relinquish his work. For ten weary months he fought a good fight, but at last on September 20 was forced to yield—and so passed away.

Such, in brief, is the history of Dr. Francis Huntington Snow's connection with the University of Kansas. What he accomplished for science during this time is known, at least in part, to most entomologists. As an enduring monument to his devotion there is now in the museum of his school one of the largest and most complete collections of insects in this country. Most of this is the result of his own personal efforts, the extent of which may be judged by the fact that he led twenty-six expeditions into the field. Some idea of the completeness and value of the collections may be gained by noting that the number of type specimens is about 1,500. The largest number of types is found among the diptera where there are 1,026. The coleoptera and lepidoptera are well represented, the former having 11,000 species, and the latter 4,800 species, and 114 types. There are altogether about 250,000 specimens distributed among 21,000 species.

These collections represent what came to be Dr. Snow's chief scientific interest, but during the many years when he had more or less of the entire science work of the school in charge, he promoted and encouraged the formation of museum exhibits in general zoology, paleontology, botany and mineralogy. Much of the strong scientific bias of the school is due to his personal interest in these branches of learning which, strangely enough, claimed his attention only after he had been obliged to relinquish his early ambition to teach Greek. Scarcely second to his entomological bent was his leaning toward ornithology. In 1872 he published the first check list of Kansas birds to which he added from year to year until in 1903 he published the fifth and last revision.

Not content with the purely scientific aspect of his work he

constantly endeavored to render it of practical service to the people of his state. For several years, during the chinch bug invasion of Kansas, he labored heroically to aid the farmers in their extremity. However much question there may be regarding the practical effects of his labors there can be none concerning his devotion and singleness of purpose toward the cause of those into whose service he thus entered. Many are firm in their belief of personal indebtedness to Doctor Snow for his assistance in their time of trouble.

Much more might be said of this excellent man, but it would all be of the same kind and tenor. He was one of Nature's noblemen—earnest, sincere and devoted; full of optimism, good cheer and courage. He lived a life of simple earnestness and hundreds of devoted students have felt and acknowledged its influence for good. The University of Kansas honored itself by formal memorial services devoted to his memory on November 10, at which time his old friends and students spoke most appreciatively of his services to science and to the state.

C. E. McCLUNG.

Two new species of the genus Phthiracarus.

By H. E. EWING, Urbana, Ill.

The genus *Phthiracarus* is one of the two genera which compose the subfamily Hoploderminae, of the family Oribatidae. The members of the subfamily Hoploderminae are remarkable in that the cephalothorax is hinged to the abdomen and is capable of being folded down upon the ventral surface of the latter in such a way as to completely cover and conceal the legs and mouth parts. This arrangement enables these small Acarina to successfully protect themselves from many of their small predaceous enemies. Up to the present time only four species of the genus *Phthiracarus* have been recorded from North America, the two described in this article making six known to this country. The writer is indebted to Mr. H. Glasgow for the collecting of one of the species.

Phthiracarus flavus n. sp.

Light yellow, darker parts light yellowish brown; integument of cephalothorax and abdomen pitted.

Cephalothorax one-half as long as abdomen and twice as long as high, rounded in front. The cephalothorax bears three pairs of prominent bristles; anterior pair about two-thirds as long as the cephalothorax is high; middle pair, which is situated at about the middle of the dorsal surface of the cephalothorax, slightly larger; posterior pair, which is situated above the pseudostigmata, two-thirds as long as the cephalothorax. Pseudostigmata situated approximate to the posterior ventral surface of the cephalothorax, oval in shape; pseudostigmatic organ two-thirds as long as the posterior pair of bristles; without head, but slightly pectinate towards the distal end. Mouth parts large, stout, and prominent. There is a very slight ridge running forwards from the pseudostigmata to the anterior margin of the cephalothorax.

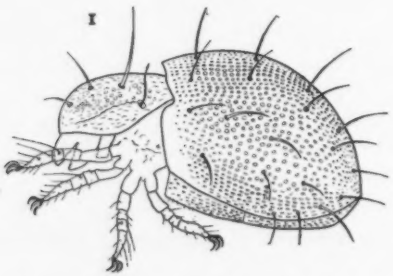


Fig. 1.—*Phithiracarus flavus* n. sp., side view, x 80.

Abdomen pointed behind; ventral margin strongly convex, anterior margin with a deep notch to allow room for the pseudostigmata and pseudostigmatic organs. The abdomen is deeply pitted; pits of about the same size and arranged in longitudinal rows. Abdomen with at least nineteen pairs of prominent bristles above; a row of five bristles on either side of the median plane; another row of five bristles just below this row on either side of the abdomen; a pair of bristles just posterior to the notch in the anterior margin of the abdomen; a similar pair situated about their length posterior to this pair; a pair situated about one-half the distance from the anterior to the posterior end of the abdomen and their length above the ventral margin of the same; three pairs of bristles situated towards the ventral margin of dorsum, and three pairs on the posterior ventral margin. The genital and anal covers together extend almost the entire length of the abdomen; inner margin of genital covers straight; inner margin of anal

covers slightly convex, genital covers each with a few very minute hairs.

Anterior pair of legs equal in length to the cephalothorax, somewhat stouter than the others; tarsus of leg I fully one and one-half times as long as the tibia. All the legs are well clothed with rather long, simple bristles Unguis tridactyle. Length, 0.78 mm; height, 0.42 mm.

In moss. Collected by H. Glasgow at Urbana, Illinois. One specimen.

Phthiracarus rotundus n. sp.

Brown; integument granulate. Cephalothorax, fully one-half as long as the abdomen and about one-half as high as long. There is a small chitinous ridge around the ventral edge of the cephalothorax; this ridge projects forwards and laterally about as far as the width of one of the dactyles of tarsus I. The cephalothorax bears two pairs of very fine hairs, those of the anterior pair being shorter than those of

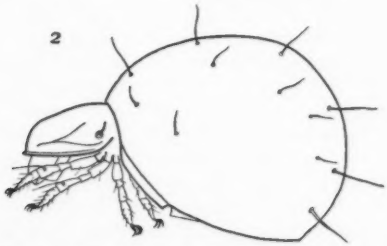


Fig. 2.—*Phthiracarus rotundus* n. sp., side view, x 80.

the posterior pair. Pseudostigmata round, disk-like; in diameter each equal to the width of tibia I; pseudostigmatic organ about twice as long as the diameter of the pseudostigma. Palpi very prominent.

Abdomen almost as high as long; the upper half of the anterior margin concave, the lower half of the anterior margin straight. The posterior part of the abdomen is rounded; ventral margin of abdomen convex. The abdomen bears about twelve pairs of small hairs on the dorsal aspect.

Legs about as long as cephalothorax; all subequal; tarsus longer than tibia; unguis large and stout, almost as long as the tarsus, from which it extends, and tridactyle, dactyles equal. Length, 0.76 mm; height, 0.52 mm.

Under a log. Collected by the writer near Batavia, Ill.

A new genus of the Siphonaptera.

By Past Assistant Surgeon Carroll Fox, P. H. & M. H. S.

Seven specimens in all, 2 males and 5 females, a description of which follows, have been obtained, from the *Scapanus californicus* taken in San Francisco. Believing them to be new, I sent them to Mr. Rothschild, who kindly looked at them and pronounced them representatives of a new genus, pointing out certain characteristic features.

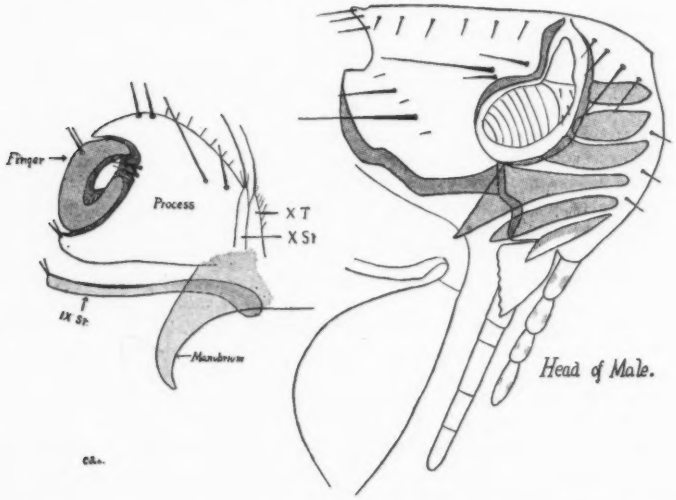
CORYPSYLLA gen. nov.

Spines on the head, structure of head, spines on back of abdomen, mesothorax not divided by a vertical suture, episternum of metathorax fused with the metanotum. Hind coxae with a patch of spines on inside. All tarsi with four pairs of lateral spines on fifth segment.

Corypsylla ornatus spec. nov.

Head very gently sloping towards the front to just above the root of the first genal spine where it rather abruptly changes its direction and curves downward and backward forming an angle. This anterior border of the frons is more decidedly curved in the female. The gena is broad from above downwards and in the posterior border is a distinct notch. Starting well up on the frons and extending downward so that the last one partly overlaps the maxilla is a row of spatulate spines six in number. They have their origin close to the anterior margin of the head. The first, or highest of the group extends to the anterior margin of the antennal groove, and terminates with a square end. The second is a little longer and slightly overlaps the anterior margin of the antennal groove and terminates with a bluntly rounded end. The third is still longer and overlaps the anterior margin of the antennal groove, the end being as it were, cut off at an angle. The fourth is by far the longest extending to the prosternum. Its end is much enlarged and terminates with an acute angle. The fifth is longer and narrower than the third, having somewhat the shape of the blade of a penknife. The sixth is shorter than the fifth and rather indistinct in outline. The maxilla is short, broad and triangular in shape with the posterior border distinctly serrate. Eyes absent. The maxillary palpi are four jointed, not as long as the labial palpi. The labial palpi are five jointed and extend almost to the end of the fore coxae in the females, but are somewhat shorter in the males. Just above the first genal spine is a row of four bristles running

obliquely upward from the root of the first genal spine to the edge of the upper part of the antennal groove. In front of the roots of the spines is a row of three smaller bristles. In the female along the anterior margin of the antennal groove at the termination of the upper three spines is a row of about four stout bristles. Along the dorsal margin of the occiput on each side of the median line is a row of about six bristles. Back of the base of the antenna is one bristle and there are two bristles, the upper the larger, back of the third joint of the antenna about its middle. Midway between the termination of the antennal groove and the lower posterior angle of the occiput is a large bristle and above and behind this bristle, another bristle, and in line with these bristles, and alternating with them are three hairs. In the posterior margin of the occiput, dorsally, is a deep notch and on the



borders of this notch are six bristles placed rather close together. The antennal groove is short and extends nearly to the upper margin of the head. The anterior and posterior margins are markedly thickened. The second antennal joint is short and contains about four small hairs. The club is short and nine-jointed. The distance between the anterior border of the frons and the end of the antennal groove is only a little greater than the distance between the end of the antennal groove and the posterior margin of the head, in both sexes.

On the posterior border of the pronotum in the female is a ctenidium

of about fourteen spines. This ctenidium is continued downward on each side by about nine very indistinct pseudo-spines, these shadowy spines overlapping the mesothorax. At the lower border of the pronotum is a long bristle, above this another smaller one and near the dorsal margin one more. In the male there is a pronotal ctenidium of about thirty-eight spines. The bases of these spines form a compound curve, above the convexity being anterior while laterally the anterior margin is concave, and this concavity is filled in by apparently a duplicate set of shadowy pseudo-spines, and between each of these pseudo-spines is an indistinct bristle. The mesonotum is short and contains on its dorsal median surface a thickened chitinous patch, this patch being prolonged over the metanotum and containing a few long hairs. The metanotum is the longest of the thoracic nota, thickened on its dorsal median surface and contains in this thickened patch an anterior and posterior row of about six long hairs placed very close together and on its lateral surface is a long bristle.

The mesothorax is not divided by a vertical suture and has, a little anterior to its middle, one long bristle in the female and two in the male, and on its posterior border two long bristles one above and one below the second thoracic stigma. The episternum of the metathorax is fused with the metanotum and contains one short and one long bristle, the metasternum has one short, stout bristle placed high up and the epimerum in the male has four or five large bristles and in the female four.

The Abdomen.—The abdominal tergites from the first to sixth, have in the median line of the dorsal surface a distinct saddle-shaped chitinous patch and a set of short, stout teeth or spines. These spines overhang the chitinous patch of the next posterior segment.

The first, second and sixth have five teeth each, and the third, fourth and fifth seven each. The three middle teeth are in each case the largest and blackest . The seventh tergite contains the thickened patch, but in place of the teeth has at its apex, in the female, two short, stout antipygidial bristles and in the male one bristle on each side. Anterior to the spines in each tergite, in the median line are several hairs. Laterally on each tergite are two bristles, one below and one above the stigma. The sternites in the male from the third to the eighth contain a single row of six bristles while in the female there is on the third a row of four bristles and on the second sternite only two bristles. The eighth tergite has just at the upper edge of the pygidium a small hook-like process and laterally in the female there are four bristles placed one above the other. Below there is a patch of about seven bristles, more or less in line, on each side and above these close to the margin about eight small bristles. The eighth sternite is very narrow. The stylet is long, narrow, cylindrical, as wide at the tip as at the base,

with a long bristle at the tip. Surrounding the stylet is a patch of bristles, on the tenth tergite and sternite.

Modified Segments in Male.—The manubrium is narrow, points downward, is slightly curved to a pointed end. The process is very large, gently rounded at its lower margin where at the distal extremity are two bristles. The upper margin is strongly convex and contains on its edge two bristles and numerous hairs. The finger is much smaller than the process, heavy, somewhat crescent-shaped with the pedicle curved strongly upward and bearing in its convex posterior margin near the end two bristles. The ninth tergite is cut off squarely at the end and contains at the upper angle a few hairs.

The fore coxa has on its outer side about ten long bristles, three obliquely placed near its base, two obliquely placed near its apex and between these an irregular oblique row of five.

The hind coxa has a row of about six teeth on the inside. The middle and hind femora have no lateral bristles. On the posterior border of the hind tibia is a row of spines in pairs of five groups and on the sides are four pairs of bristles, each pair being obliquely placed. None of the apical bristles of the tibiae, or tarsi are as long as the next joint. On the anterior surface of all of the tarsi is a single row of bristles. The fifth tarsal joint of each leg has four pairs of lateral spines.

Length of tarsi, hind leg, 10-7-4-3-6; mid. leg, 5-5-3-2-6.

Length of female, 2.66 mm; length of male, 2 mm.

Color, pale brown.

A Dragon-fly Puzzle and its Solution.

By T. D. A. Cockerell.

In the summer of 1907, Mr. Geo. N. Rohwer found the hind wing of an Aeschnine dragon fly in the miocene shales of Florissant, Colorado. In the process of going over the material, I came upon half the specimen, the rock having split so as to divide the wing longitudinally. Having before me only the inferior part of the wing, and ignorant of the fact that the costal and stigmatic region had been preserved, I set out to determine the affinities of the fragment. It seemed a good opportunity to ascertain whether it was possible to settle the generic position from parts usually considered of minor importance.

I had very well preserved the ends of the radial sector and radial supplement, the ends of the third and fourth branches of

the media, with accompanying supplement, and the ends of the branches of the cubitus. It appeared evident that the best characters were in the media and supplement, and attention was concentrated on these. At the very outset it was noticed that the medial supplement was very strong, only zigzagged at its very end, and its apical half was strongly curved. Taking the genera with a strong supplement, it was easy to construct a table in

Hind Wings.

One row of cells between supplement and M_4 . . . . . 1.
More than one row of cells between supplement and M_4 . . . . . 2.
1. Seven double cells between M_3 and M_4 . . **Planaeschna**, **Oligoaeschna** (**Dolaeschna**); also, but with two double cells (at apex) between supplement and M_4, **Telephlebia.**
Three or four double cells between M_3 and M_4.
Ten cells on margin between Cu_1 and M_4 . . . . . **Brachytron.**
Fourteen cells on margin between Cu_1 and M_4 . . . . **Nasiaeschna.**
At most one double cell between M_3 and M_4 (head no doubt **Lithaeschna,** but the region partly obliterated).
Two strong veins running from supplement to margin.
Perithemis (Libellulid).
No strong veins running from supplement to margin.
Gomphaeschna.
2. Supplement bent so that a point near middle is nearer the margin than a point beyond . . . . . **Anax, Hemianax.**
Supplement not thus bent . . . . . 3.
3. Not more than two rows of cells between M_4 and supplement.
Boyeria, Aeschnophlebia.
More than two rows of cells between M_4 and supplement, at least in part of their course . . . . . 4.
4. M_4 with a little bend or deflection not far from the end . . . . . 5.
This bend absent or barely suggested.
Basiaeschna; see also **Aeschna juncea.**
5. Cells between M_3 and M_4 double from bend of M_4 on. **Hoplonaeschna.**
Cells between M_3 and M_4 double at bend, but mostly or all single beyond . . . . . 6.
6. Where supplement and M_4 are widest apart, six rows of cells between.
Staurophlebia, Amphiaeschna.
Where supplement and M_4 are widest apart, not over four rows of cells between . . . . . **Gynacantha, Aeschna californica.**

In this scheme, the fossil ran straight to *Basiaeschna,* with which it agreed well, except that the cells between Cu_1 and Cu_2 were somewhat different, and especially in the arrange-

ment of the cells below Cu_2 where two or three large pentagonal areas were marked out by stronger veins. On the whole, however, there did not seem to be any reason why the fossil should not go in *Basiaeschna,* and it could certainly not go in any of the other genera, unless it were *Aeschna* of the type of *Ae. juncea.*

At this point the other half of the wing was found, and it was seen at once that the radial sector was branched, throwing it decisively out of *Basiaeschna,* and into *Aeschna* or some very closely related genus. Further investigation showed that it was in fact the hind wing of *Aeschna solida* Scudder, based on a single anterior wing. Another front wing of *Ae. solida* was found by Mr. S. A. Rohwer in 1907 (Station 14, Florissant). I would not have recited the above merely to record the birth and early death of a mistaken idea; it is given because it seems to be really significant in relation to the evolution of these insects. Dr. Needham (Proc. U. S. Natl. Museum, xxvi. p. 735) writes that in *Aeschna* and its nearest allies:

"There is this added feature—the radial sector has become forked. It will be observed that the anterior branch of this fork is separated from vein M_2 by a single row of cells, and that in the same place in *Basiaeschna* there is a line of cross-veins tending to straighten out. The anterior branch of the fork is developed out of this line of cross-veins. In the Australian *Aeschna brevistyla* all stages of its completeness and incompleteness may be found in a series of specimens."

The study of other features of the wing shows that *Basiaeschna* has indeed much in common with *Aeschna,* so that they should doubtless stand together as the connecting links of the series with branched and unbranched radial sectors.

In *Aeschna* itself, however, we have two types of branching of the radial sector. In *Ae. juncea, Ae. constricta* and the fossil *Ae. solida,* the upper branch comes off from the lower quite abruptly, and has all the appearance of being but a branch. In *Ae. californica* and in *Coryphaeschna* the effect is reversed, and the upper branch actually appears to be the continuation

of the main vein. According to the doubtless correct explanation of the origin of the branch cited above, the first group is the primitive one (at least as regards this character), the second being a later development. In this and some other points *Ae. californica* stands far from such species as *Ae. juncea,* and thereby nearer to, but not in, *Coryphaeschna.* It probably deserves subgeneric rank.

Aeschna solida Scudder.

Some of the more interesting characters of this species are here described:

(1). Stigma of hind wing comparatively short, bounding three cells below (in *Basiaeschna* it is much longer, and bounds 4¼ cells).

(2.) Postnodal cross veins 15 (Scudder's figure) to 16 (our specimen) in front wing; 17 in hind. The number is less in modern *Æschna,* especially in *californica.*

(3.) Doubling of cells between M_1 and M_2 begins two cells below base of stigma. Almost exactly this condition is found in *Æ. constricta;* in *juncea* it begins under apical half of stigma, in *californica* and *Coryphaeschna* beyond stigma. Thus there is a reduction of the doubling in the supposed line of evolution. In *Basiaeschna* the doubling begins under anterior half of stigma.

(4.) The bend of M_2 is distinctly more gentle than in *Basiaeschna.* This agrees with *Æschna.* The highest point of the bend is distinctly before the stigma; in *Æ. constricta* it is a little further on, but nearly the same; in *Æ. juncea* it is under the stigma; in *californica* under apex of stigma.

(5.) M_4 has a decided kink in anterior wing, but in posterior this is scarcely suggested. This practically agrees with the supposed primitive section of *Æschna,* but differs greatly from *Æ. californica.* In *Coryphaeschna* the disturbance has gone so far that M_4 looks as if it ran into M_2, whereas it is really widely deflected in the contrary direction.

(6.) The branches of the cubitus in hind wing spread apically, so that the single cells between them give way to double or treble cells forming an irregular network. In *Æ. constricta* and *juncea* there are no single cells between the cubiti; in *californica* all those between the apical halves of these veins are single; in *Coryphaeschna* there are no double cells, or only one or two. *Epiaeschna heros* agrees essentially with *Æ. solida.*

(7.) The large pentagonal areas below Cu_2 in hind wing are shown in the figure. There is a suggestion of something similar in *Æ. juncea.*

(8.) The forking of the radial sector occurs considerably anterior to the stigma, especially in the hind wing. This is like *Æ. constricta* and *californica,* not like *juncea.*

I am much indebted to Mr. E. B. Williamson for the loan of a number of photographs, which greatly facilitated the above comparisons. The recognition of the identity of *Dolaeschna* with *Oligoaeschna* is due to Dr. Calvert.

Some Observations at Southern Pines, N. Carolina.

Three Mound Builders.

By Abram Herbert Manee, A. M.

(Plates XX and XXI)

As reported to me by Mr. E. A. Schwarz through Dr. L. O. Howard, the genus *Bradycinetus* is confined to Central and North America, the only species in the Atlantic States is *ferrugineus;* nothing hitherto known of habits save that in Florida it is taken late at night as it is attracted to light; species rare.

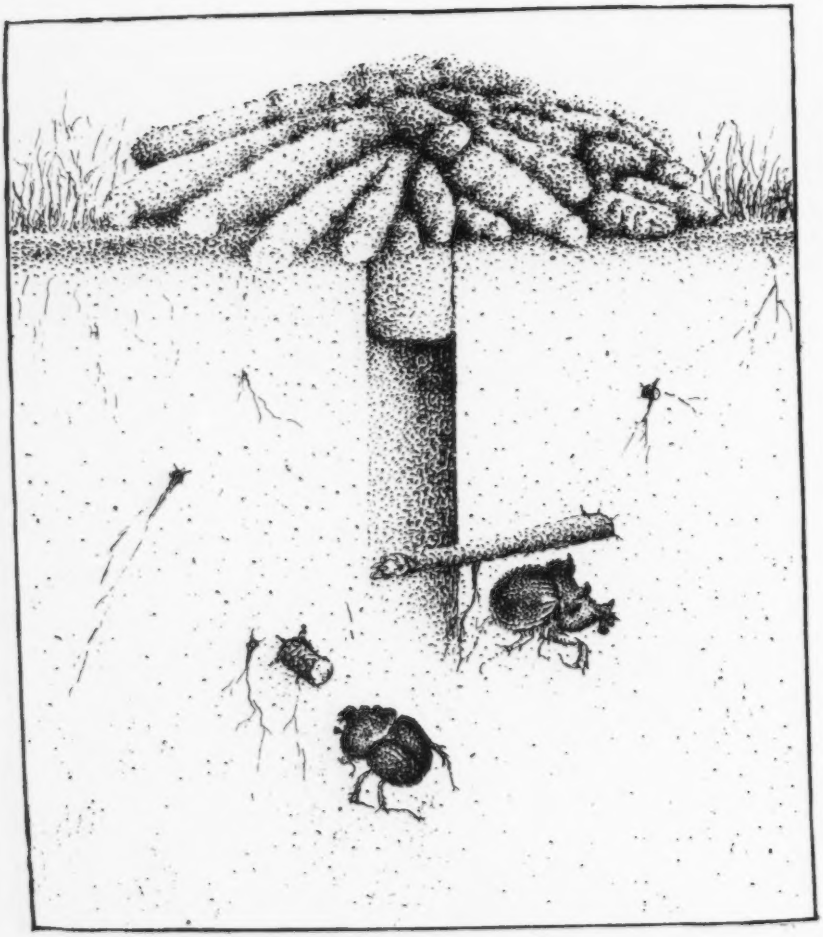
In winter of 1904-5 I found a fragment of a male with thorax under a board. This was probably the first specimen taken in North Carolina. About 9 P. M., on June 5, 1905, two males came to our window as we were light hunting for moths. On July 16, 1906, our discovery of the haunts of *Strategus antaeus* suggested to my wife the probability of finding more of our species not yet identified and which I classed as a *Bolboceras.* Finding a four-inch mound in our yard, Mrs. Manee soon dug out a lively pair of *B. ferrugineus* and a few minutes later two other mounds each disclosed a pair, and that summer we unearthed over sixty specimens. During the three seasons of '06, '07 and '08 we have taken over 100 specimens, whereas had we not known the day haunts our entire find would have comprised not more than 4 specimens and those all males.

The beetles fly and evidently mate at night. I have observed a male moving about but a few inches above the earth

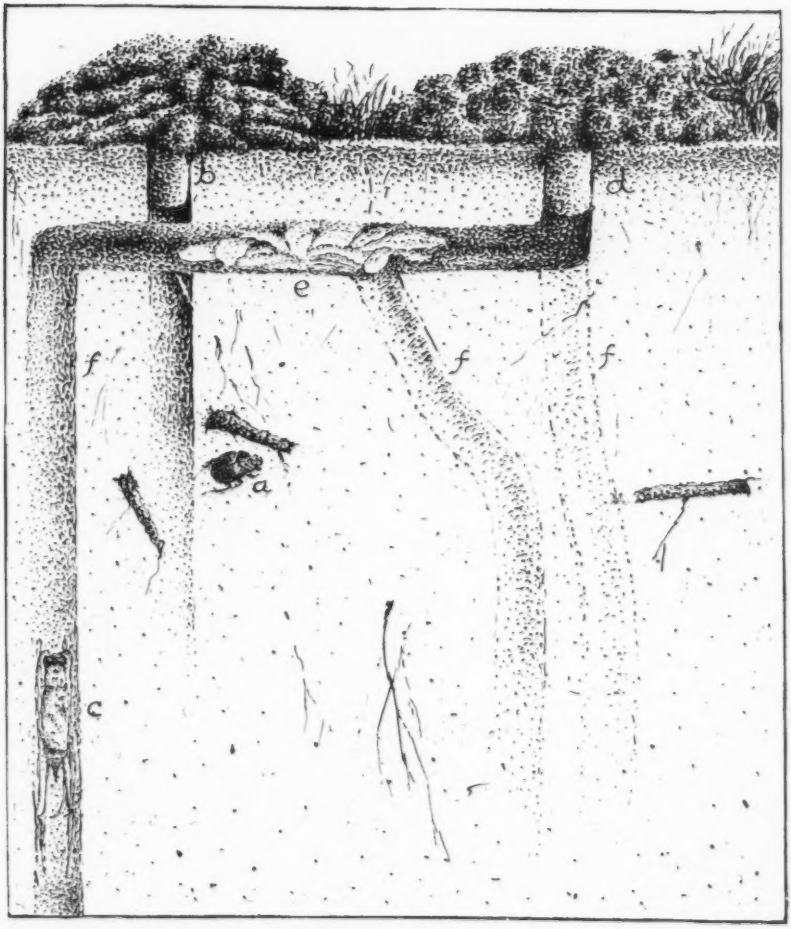
as if scenting out its next day's habitat. Its goal is a small rotten or semi-decadent root of oak. With its fore-tibiae it digs a half-inch perpendicular shaft to a depth of from four to nine inches and in its work it is not *bradycinetus, slow-moving,* but very rapid. The excavated soil is pushed to the surface where it forms a mound two inches in median depth and four inches in diameter. This mound is like a pile of broken encrinite stems or "ropes of sand." When a pair are at work together the shaft is (as in illustration) packed with soil at the top to a depth of an inch. Usually when a male is working alone the shaft is open to the surface as if awaiting a female and reciprocally this is often so when the female is alone. I have never found two of the same sex under the same mound. The season for working is here from early June to late August, but from a hundred diggings I have seen no sign of a nest nor have I found even one egg. Moreover, I have examined many females freshly killed and have only one mass which I take to be an egg. It is white, globular and one-sixteenth inch in diameter.

I have not seen any species of *Bradycinetus* except *ferrugineus.* I have not seen any species of *Bolbocceras* except *lazarus.* Yet I feel sure that these two species should be placed in the same genus and the generic name be *Bolbocéras* as the *antennae* of *ferrugineus* are as truly *bulb-shaped* as those of *lazarus* and they are not *Bradycinetus* or *slow-moving.* The two species are more nearly alike except as to size than *splendens* and *antaeus* the two species of *Strategus* which occur here. Moreover, *Bolbocceras lazarus* builds a mound and shaft precisely like *ferrugineus* except that they are proportionately smaller, the mound two inches in diameter of stems or ropes of soil and the shaft a quarter inch.

B. lazarus is reported to me as: Common in both Hemispheres; a scavenger; nothing known of habits except that it has been found under decadent leaves. My illustration will disclose what little I have learned of this species. It may guide observers in other localities to a larger knowledge. Though it must propagate in decadent matter it cannot truly



MANEE ON BRADYCINETUS FERRUGINEUS.



MANEE ON BOLBOCERAS AND ANUROGRYLLUS.

a. *Bolboceras lazarus*. b Mound and shaft of *lazarus*. c. *Anurogryllus muticus*. d. Mound and shaft of *muticus*. e Horizontal chamber of *muticus*. f. Retreat shafts of *muticus*.

be called a scavenger, as it does not convey its larval food from the surface, but, like *ferrugineus* and the species of *Strategus* and *Dynastes*, it seeks under-ground debris which is not polluting the air. Indeed, *S. antaeus* buries dead leaves and *D. tityus* revels amid over-ripe and rotting fruit in the orchards. These are more nearly scavengers though not so like in form of wing-case to the Geotrupes.

Anurogryllus muticus. I mention this cricket because its mound, very common here, so nearly resembles the mound of *B. lazarus.* The latter is formed of stems, the former of crumbs, but they are alike in size and shape. *A. muticus builds* near some small weed whose leaves furnish the wide but shallow horizontal chamber, and the shaft where the insect lodges may extend in any one of the three positions indicated in our illustration.

On April 16th, in a sandy road we found several mounds almost exactly like those of A. *muticus.* At the base of the vertical quarter inch shaft from eight to ten inches deep we took in each case one or two specimens of the Carabid beetle, *Geopinus incrassatus.*

Since my paper in the June *News,* I obtained a new date record for *Strategus antaeus* having dug out a female, June 15, or five weeks earlier than my previous first record. However, this has been throughout a much earlier season than usual. I am also on the track of *S. splendens.* I find that it comes out for a promenade just after nightfall, walking slowly over paths where its polish may reflect the lantern rays. Its neighborhoods are rare and far apart, but where one is found are traces of others. It is *bradycinctus* or slow-moving and thus is seldom found perfect or entire. The voracious ants eagerly disintegrate and mutilate any beetle alive or dead they may master or meet. I took a *splendens* at near noon tumbling about the grass as if blind, but as it was minus one antenna I conjectured that its unusual diurnal wandering was due to its one-sided sense of smell and sound. The brooding haunt of *splendens* is still in part a mystery, but from certain hints from local diggings, I am more than guessing that it does

not make a mound or shaft, or nested chamber as does *antaeus,* but burrows horizontally beneath dead oak roots somewhat as does *Dynastes tityrus,* but not so deeply. Its life course as imago is from January 1, to July 1. At least these dates are the extremes of my record.

P. S. The male of the *Bradycinetus ferrugineus* has a profile resembling a pig. It should have been called *porcus.*

How a Hungry Flea Feeds.

By M. B. Mitzman, B. S., Entomological Laboratory, University of California.

A male squirrel flea (*Ceratophyllus acutus*) was starved for five days and then permitted to roam at will on the back of the writer's hand. He took four strides and settled on a hairy space, and taking firm hold, ceased abruptly in his locomotion, projected his proboscis and commenced to clear for action. A space was drilled by the picking epipharynx and the saw tooth mandibles supplemented the movement by lacerating the cavity formed. The two organs worked alternately, the middle piece boring and the two lateral elements executing a sawing movement. The mandibles, owing to their basal attachment, are "capable of independent action, sliding up and down but maintaining their relative position and preserving the lumen of the aspiratory channel." The labium doubled back, the V-shaped groove of this organ guiding the mandibles on each side like an arrow from a bow.

The action of the proboscis was executed with a forward movement of the head and a lateral and downward thrust of the entire body. As the mouth parts were sharply inserted the abdomen raised simultaneously. The hind and middle legs were elevated like oars resting above the surface of water. The forelegs were doubled under the thorax, the tibia and tarsus resting firmly on the skin and serving as a support for the body during feeding. The maxillary palpi were retracted sharply beneath the head and thorax.

The labium continued to bend at first acting as a sheath for

the sawing mandibles and as these were more deeply inserted it bent beneath the head with the elasticity of a bow, forcing the mandibles into the wound until the obtuse maxillae were embedded in the epidermis. When the proboscis was fully inserted the abdomen ceased for a time its lateral swinging.

An acute pain was felt when the mandibles had half way penetrated and subsequently during each distinct movement of the abdomen. The swinging of the body continued at intervals of one to three minutes during the first fifteen minutes. In the next twenty minutes the lateral movement ensued every eight minutes and toward the end of the process the abdomen moved once very slightly. After the first twenty minutes the sting of the biting was not discernible; indeed, after the first sensation of pricking the pain became duller. This was experienced quite distinctly four times during the process. The only intimation received that the parasite was pursuing its bloody quest toward the end of the experiment was a feeble downward thrust of the springy bow-like labium accompanied by the feebler oscillations of the elevated abdomen, through the translucent walls of which could be discerned a peristaltic flow of blood, caudally from the pharynx.

During the prehensile function the antepygidial bristles waved once quite perceptibly, and the mid-tarsi maintained a constant rhythmic aerial vibration. At the end of fifty-nine minutes the victim tired of maintaining the hand in one position, and changed the attitude too abruptly, jarring the industrious flea, which quickly withdrew its proboscis by lowering the abdomen and legs and shaking the head laterally.

Prior to being bottled this untiring guest appeared much perturbed at the interference with its sanguinary feast. It wandered about seeking for another inviting spot—an oasis for its five day thirst.

A Cockroach New to the United States.—Among some undetermined material from Arizona in the collection of the National Museum has turned up an adult female of *Steleopyga rhombifolia* Stoll. This constitutes a new record for our fauna. The specimen was taken by Mr. E. J. Oslar, at Nogales, Arizona, in 1905, June 14.—A. N. Caudell.

Notes on the Egg and Larva of Goniops chrysocoma (O. S.).

By W. R. WALTON, Harrisburg, Penna.

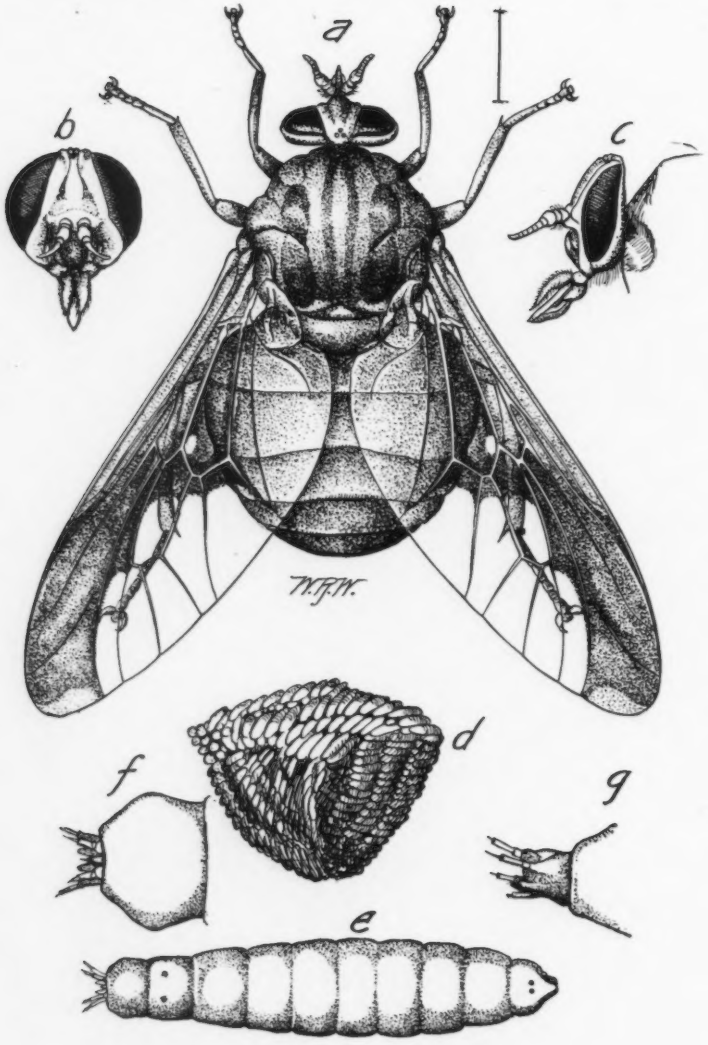
(Plate XXII)

The first fly of this species seen by me was presented by Mr. Warren S. Fisher, of Highspire, Pa., who took a female in the act of ovipositing on a leaf of what proved to be *Angelica* sp? on July 4, 1907, near the above mentioned place. The plant overhung a small, more or less permanent ditch of water and we naturally inferred that the larva might be aquatic in habit, in common with others of the family.

However, during the present year on the 14th of June, while collecting on a dry hillside, in a brush patch, some five miles to the eastward of the former locality, I was attracted to a small oak sapling by a peculiar buzzing sound. After several minutes of stalking and intent observation, a female of *Goniops chrysocoma* was discovered in the act of ovipositing on the under side of one of the leaves. She made no effort to escape, indeed it required considerable force to remove the insect from her position near the eggs. The immediate locality was a hillside pasture lot, half covered with scrub oak and berry bushes, dotted here and there with clumps of false indigo. The nearest water was a small overgrown ditch some 60 feet distant.

On the 18th of the same month I visited the spot near Highspire mentioned above, in hope of securing additional data and was rewarded by finding another fly in a similar position on a leaf of the wild cherry, some thirty feet distant from the water.

The two batches of eggs were placed in breeding jars and on the evening of July 25th the first larvae made their appearance. The second lot appeared two days later. The eggs are yellowish-white when deposited and change but little if any in color before hatching. The larvae are quite lively when hatched and it was a curious sight to see them come tumbling out of the eggs by dozens when the cluster was brought under the bright light.



GONIOPS CHRYSOCOMA (O. S.).—WALTON.

The larvae I divided into three lots, the first was placed in earth entirely submerged in water, the second in dampened sand without food of any kind, the third in a jar of damp earth together with some small angle worms.

Twelve hours later the first lot were all dead, both of the other groups were lively and apparently in good condition, the second group continued to live without food for about ten days and then died. The remaining group lived for some weeks but finally died also, the angle worms being alive and uninjured.

From which I conclude, that in all probability the larva is terrestrial and the period of incubation is from seven to ten days.

Prof. J. S. Hine kindly determined the fly for me. The eggs, which are deposited upon the under surfaces of the leaves of various herbaceous plants and trees, in a three-sided pyramidal heap, are yellowish-white in color, about 1.5 mm. in length, slender, slightly curved and resemble those of many other flies in general appearance. One of the heaps contained 534 eggs by actual count.

The freshly hatched larva is slightly more than 2 mm. in length, slender but capable of contracting its body into an almost spherical mass; in color it is pale yellowish-white, semi-translucent. The head, which is capable of being entirely withdrawn into the first thoracic segment, bears several pairs of antenna-like appendages and an obtusely pointed chitinous hook.

On each side of the median line of the body, within the second thoracic segment, there is a distinct pinkish spot, also on the last segment there is a pair of round black spots resembling stigmata; elsewhere the body seems to be absolutely devoid of hairs or tubercles.

EXPLANATION OF PLATE XXII.

a Dorsal view of female.
b Front view of head.
c Lateral view of same.
d Top view of egg cluster.
e Dorsal view of young larva.
f Dorsal view of 1st thoracic segment, head nearly concealed.
g Lateral view of head and mouth parts.

A new Bee from Tahiti.

By T. D. A. Cockerell.

When Mr. R. W. Doane wrote that he was starting for Tahiti, I begged him to look out for bees; as, to the best of my knowledge, not a single species had been recorded from that locality*. He has brought home two species; the larger, respresented by three females, proves to be *Lithurgus atratiformis*, Ckll., the smaller is a new *Megachile*. All were collected in August, 1908. *L. atratiformis* has hitherto been known only from the warmer parts of Australia; the specimens from Tahiti are about 1 mm. smaller than the type, but otherwise identical.

Megachile doanei n. sp.

♂ Length, about 10 mm., with a large head and short abdomen; general appearance almost exactly like that of the S. African *M. latitarsis* Friese, though the abdomen is shorter. Black, without any red color except that due to pubescence; head large; eyes dark purplish; antennae long and slender, entirely black, not expanded at apex; mandibles tridentate, and with the usual basal inferior tooth; face densely covered with long creamy-white hair, tinged with ochreous about the level of the upper part of the clypeus, and from this level upwards black along orbital margins; vertex dull and very densely punctured, with pale yellowish hair, except about ocelli, where it is black; thorax with yellowish-white hair, but it is pale ochreous on scutellum, and black on disc of mesothorax and middle of pleura; mesothorax and pleura dull and very densely and minutely punctured; tegulae black; wings strongly dusky, the nervures and stigma black; legs black, the hair on femora pale, on tibiae black or almost, on hind tarsi black on outer and copper red on inner side; on middle tarsi, copper red on both sides, except a little pale yellowish at base beneath; anterior tarsi a little flattened and broadened (basitarsus not much over twice as long as broad), with a strong yellowish-white fringe of hair; claws cleft at apex; abdomen broad and short, rather shining, the first segment with long pale ochreous hair, and indications of a red apical fringe; third to fourth each with narrow orange-red apical hair bands; fifth covered with orange-red hair, except at extreme base of middle; sixth with orange-red hair at sides and paler in the middle; apex of sixth segment produced into two widely separated prominent blunt teeth, the interval between them strongly concave; seventh segment without teeth or spines.

Tahiti, Aug., 1908, 2 males. (*R. W. Doane*).

This species is related to several which inhabit Australia. It also appears to be close to *M. diligens* Smith, from Honolulu; differing in the black hair on the thorax, and other particulars.

* I find, however, one record of a bee from Tahiti: *Lithurgus albofimbriatus* Sichel, Reise der Novara, 1867. This species is also known from Samoa.

Popular Fallacies Regarding Insects; and some Insects that are Poisonous.

By W. R. Walton, Harrisburg, Pa.

In the paper which I shall present for your consideration this evening there is included at least one organism that is entirely without the pale of entomology. I refer to the hair worm, but as the economic entomologist is often called upon to answer questions regarding this and other forms not included in the class Insecta we think it quite proper that some of them be mentioned in the present paper.

When the speaker was a boy some ten years of age, his family moved from a large city in the middle west, to a farm in the southeastern corner of New York State.

He had never been in the country before and the book of nature now opened to him for the first time became a source of wonder and delight. But this delight was not unmixed with dread because of the tales which were told, of this insect or that reptile, whose bite was instant death, or whose diabolical ingenuity enabled it to sew up one's ears or perform other unheard of and monstrous deeds of aggression. And from the fact that many of these wonderful stories, emanated from persons in whom he had the utmost confidence, they became part of his boyish faith for a time. But as months passed on and neither he nor his companions were attacked by the beings of whom the terrible tales were told, he began to doubt and (being nothing if not curious), at last to experiment with them. The results of the experiments tended to upset all of his lately acquired lore, but this gave him great prestige in the eyes of his companions, who, still believing in the old yarns, looked on with awe as he juggled garter snakes, or wooden horses (Phasmidae), or held devil's darning needles by their wings while they champed their jaws in fury and curled their venomous tails in fruitless efforts to sew up his fingers.

One of the most wonderful of the tales current among the country folk of that region and one which I believe to be very

widespread, was the fable of the "Hoss Hair Snake." We often came upon the snakes, as they were called, in little puddles of water left by the rain or in watering troughs and sometimes in spring houses. We were told that they were originally hairs from the mane or tail of the horse, and some persons declared that these wriggling creatures were also produced from human hair. The bite of the hair snake was said to be very dangerous to man and was likely to cause the loss of the member bitten. One species of hair worm which is white in color, and is sometimes found in cabbage heads is reputed by the country people to be very poisonous. Prof. Surface has been called upon a number of times to refute this fallacy which seems to be a common one in some parts of Pennsylvania. An excellent article on this species is Mr. F. H. Chittenden's treatise published as Circular No. 2, of the U. S. Bureau of Entomology. I shall not forget my first attempt to rear a hair snake. Taking a long horse hair. I placed it in a pail of spring water and set the same in the sun as per directions, where it was to remain for seven days, no more, no less; visiting it daily, my hopes gradually sank until the seventh day, when I took it out, examined it, and while limp and wet, never a wriggle or squirm could I get it to make, it was still a horse hair and nothing more.

When I related my experience to the initiated, the oracle informed me that "O' course ye can's make no 'hoss' hair snake out of a hair that hain't got no roots on it; what ye wanter do is to pull one out by the roots and put it in the water right off, then ye'll git a hoss hair snake sure." Alas for the credulity and the credibility of man! I was again doomed to disappointment, for on the sixth day there was no change in the hair and on the morning of the seventh day when I looked, behold some thirsty creature had drunk three-fourths of the water including the hair. And it was some years later that I first read of the natural history of the hair worm or Gordius.

Dr. Jos. Leidy of Philadelphia, published in the *Entomologist and Botanist*, 1870, Vol. III, No. 7, a partial life history

of this nematode, by which it was shown that the larger portion of its life is passed within the body of some insect in a similar manner to the "Guinea worm" and other round worms in man and the lower vertebrates.

Every spider, and especially the "black spider," was considered as a deadly poisonous creature. The only exception to the rule that I can recollect was the "daddy long legs" or harvest man, which no one seemed to fear, and which the boys used to dismember (young savages that we were) to see the legs kick after they were severed. However, there is no denying the fact that some few species of spiders are capable of inflicting dangerous bites. This was brought out in *Insect Life* some years ago when an exhaustive discussion of the subject, almost world wide in its scope, was carried on. It was shown beyond cavil that spiders of the genus *Lathrodectes* had caused the death of human beings in a number of instances. Especially in New Zealand, where the Katipo, a member of this group, is greatly feared and justly so, because its bite is known to have caused serious results in a number of cases.

There is a species occurring on the Atlantic sea board as far north as North Carolina, which is reported in a number of apparently well authenticated cases, as having produced intense suffering and even death, by its bite. We find a good account of this in *Insect Life*, Vol. I, No. 7, Page 204, where an illustration of the species is supplied. Notwithstanding the fact that the late Dr. Marx of Washington, secured entirely negative results from his experiments with the poison of this creature when applied to the bodies of the smaller mammals, it behooves us to observe the utmost circumspection in handling black spiders having red and yellow spots on their abdomens. The members of the genus *Lathrodectes* are so marked and regarded with dread by both savage and civilized man alike throughout the world, wherever they occur. The same story is told by all. "It bites and its bite is painful and dangerous."

Going on up the scale of invertebrate life, the next form that

I remember as terrorizing the exemplars of the simple life, was the "devil's darning needle," "snake feeder or snake doctor," as it is called hereabouts. We are all familiar with the story that this singular insect is capable of sewing one's ears up, for what purpose has never been divulged, which leaves us to assume that it was for "pure deviltry." Of course, no credence is placed in this absurd story at the present day by "grown ups," but the children in some parts of the country still cling to the fallacy.

One of the peculiar local myths with which we were familiar in boyhood, was that of the wooden horse, a local name for the walking stick insects. Its bite was said to be peculiarly fatal, one could not expect to live long enough to murmur even a short prayer if bitten by one of these creatures; you simply turned up your toes and died instanter. It is inconceivable that this sluggish, fragile creature could ever harm a human being, as it is incapable of biting anything but leaves, which form its ordinary food.

Another fallacy more widespread and popular than the last is the one regarding the ability of the 17 year Cicada to inflict a poisonous bite. This fable will not down. In this respect it reminds us of the old line in our copy book, "Truth crushed to earth shall rise again." It is counterfeit, however, and there is not a particle of truth in the yarn. There existed for some years a spirited discussion among entomologists, as to whether or not the cicada ever made any use whatever of its formidable beak, but the question was at last settled by Prof. Quaintance of Washington, who discovered a cicada in the act of feeding, with its beak in the sap wood of a tree. He killed it in situ and making a section thereof, proved with the help of a microscope, the facts above mentioned.

It seems strange to me that in spite of the tendency of the people at large to attribute poisonous qualities to harmless insects, of many kinds, there should exist in considerable numbers in practically all parts of the country, insects that are capable of inflicting painful bites, but of which one seldom hears except through scientific publications. I refer especially to the Hem-

iptera Heteroptera, the true bugs. The speaker has had personal experience of a painful nature with at least two species of these insects; the first of which was a pair of Notonectidae, or back swimming bugs. Having scooped up a pair of them in the hollow of my hand, on attempting to grasp them, one of the insects inserted its beak into the ball of my thumb. There was an immediate burning pain in the member, which began quickly to swell; this pain and swelling extending to the elbow in a short time. The soreness remained for several days and was much more severe than the result of any bee sting I ever received. The other insect was a species of assassin bug (family Reduviidae), which bit me between the fingers and caused swelling and pain to no mean extent. There are many other species which are known to inflict painful and sometimes dangerous bites; among which may be mentioned *Conorhinus sanguisuga,* sometimes known as the big bed bug. It is a southern species and is quite troublesome at times. Also, *Rasahus biguttatus,* a western species, said to inflict a severe wound, and two species which abound in Pennsylvania are *Melanolestes picipes* and *Opsecoetus personatus.* In fact all the bugs of the family Reduviidae should be handled with the utmost care. There is no doubt in the mind of the speaker, that the giant water bugs, *Belostoma americana* and *Benacus griseus,* are capable of inflicting severe bites, as they are known to be able to kill small fish almost instantly by means of the beak. However, we must admit that no report of their having bitten any one has come to our notice.

Many of us will no doubt recollect the kissing bug scare which swept over the country some few years back; of the insects reported as having done the kissing, fully 75 per cent. were true bugs which belonged to the family spoken of above.

Another famous hoax of childhood was the "ear wig"; this affectionate insect, which by the way carries a pair of forceps at the end of its tail, was supposed to crawl into the ear of a sleeping person where it remained to torture him till "kingdom come." Of course, the story is a myth, although insects do occasionally enter people's ears accidentally and are a source

of intense pain and annoyance until removed. As a matter of fact, the ear wig appears to be rather an uncommon insect in collections and is seldom seen in nature. The forceps are used in arranging the true wings in folding them upon the back, the insects being harmless to the last degree. What were usually pointed out to me as ear wigs were several kinds of centipedes or millipedes. Some of the larger of these centipedes can and do bite severely when roughly handled. The house centipede or skein centipede, a really beneficial creature which feeds largely on roaches, should never be grasped with the bare hand as it is capable of inflicting a wound.

We still retain a vivid recollection of an occasion upon which there had been a wholesale sacking of bumble bees nests and the slain bees strewed the ground in considerable numbers. Upon picking up one of the dead bees for a good look, we were very much pained and grieved because the headless corpse stung us on the finger quite badly. She was dead, but it had not occurred to her as yet.

We cannot pass the Diptera by without saying a word regarding the mosquitoes. It is only a few years since the mosquito was regarded as merely a troublesome insect, annoying but not to be regarded in any way as dangerous. To-day, thanks to Economic Entomology, the mosquito is known to be the transmitter, if not the source of yellow fever, malaria, and elephantiasis; three very serious diseases, all of which are on the wane in civilized countries, because of rational treatment made possible by the sacrifices of heroic scientific investigators. When the relation of the common house fly to disease shall have been fully studied we expect revelations more astounding than the facts mentioned above. There is an old expression and I believe it is a verp ancient one, "As harmless as a fly." Go back for a few hundred years to the time when the first rays of the light of modern hygiene had not as yet penetrated the inky gloom of ignorance. During the early part of the 17th century, in the immense city of London, before the coming of the "Great Plague," and the fire that followed it, sanitary sewers were unknown, the gutters ran filth

of every conceivable kind, and it necessarily follows that flies bred by millions; they swarmed everywhere. Window screens were unknown or only within the reach of the rich. We need not wonder that 68,000 men, women and children paid the death penalty for the frightful conditions which must have prevailed at that time. But we have before us an example more recent than the one just mentioned in testimony against the fly. I refer to the frightful rate of mortality which prevailed among our soldiers at Chickamauga. There is not the least doubt now in the minds of persons who have studied the question, that the terrible typhoid scourge which occurred there, is directly traceable to flies, these insects flying from the open latrans or closets, to alight upon the very food which was being eaten by the men at mess. It is revolting to think upon, but it is nevertheless true.

And we are convinced that if the effects of the house fly and its near relations upon the destiny of man, could be shown at a glance to the people at large, the world would stand appalled by the vision and the elimination of the house fly would follow as a matter of course.

Additional Notes on the Life History of Culex perturbans.

By JOHN A. GROSSBECK.

(Plate XXIII)

In the January number of this journal, page 22, the discovery of the larva of *Culex perturbans* in nature is reported by Professor J. B. Smith and in the report of the New Jersey Experiment Station for 1907 the life history as far as then known is given by the present writer in some detail. The method of egg laying and the habits of the larva were worked out, but on account of the hibernation of the latter the pupa remained unknown. It was with some interest therefore that the approach of spring was awaited and early in March the first *perturbans* hunt was made at Trenton, N. J.,—not for the purpose of securing pupæ but to gather in a host of larvae that

pupation might be observed in the laboratory and the duration of the pupal period thus determined.

Over a hundred larvae were soon under observation, but separated from their vegetable attachments they showed an evident disposition to rise to the surface, there to become sluggish and finally die. Single strands of roots or even small bits of sod taken from the swamp were ignored by the larvae and we ultimately found that if we would bring any to maturing we must secure for them conditions as nearly natural as possible. Accordingly an entire grass tussock was brought from the swamp and, with a new supply of larvae, was placed in a large battery jar. Soon the larvae disappeared, all of them having worked their way in among the roots of the tussock. From day to day this jar was watched but no pupae were observed until on May 20th two dead male adults still attached by their feet to the pupal skins were on the water's surface. The sod was now removed from the jar for examination and four living and two dead larvae were taken from the vegetable mass; also two living and one dead pupa. The two living pupae were transferred to clean water and unlike other *Culex* pupae immediately sank to the bottom and aside from an occasional flap of the anal paddles showed no signs of life. At the bottom they rested with the abdomen curved under the thorax, the paddles closely appressed to the "face" (upon which it stood) and were most generally tilted to one side, though occasionally they assumed an erect position. For three days the pupae remained in this death-like attitude and were then placed in alcohol, supposedly dead.

In general build and appearance the pupa of *C. perturbans* resembles the normal *Culex* type but a strikingly characteristic feature is found in the long, slender air tubes which converge apically and finally meet at a common apex. In color it is light brownish with the head and thorax, except those portions inclosing the metanotum and eyes, soiled whitish. The length of the thorax is about 2.5 mm. and including the extended abdomen, which is unusually long, about 7 mm. The air tubes measure 1 mm. in length or slightly over, are strongly in-

fuscated and finely ringed for over two-thirds their length from the base and are suddenly constricted toward the tip, conforming in this respect with the air tube of the larva and evidently for a similar purpose. The entire pupa is destitute of external vestiture except for two small hairs situated near the base of the second abdominal segment. The anal paddles are long about four times as long as broad, and have finely serrated margins.

On June 2d the first pupa was collected in the Trenton swamp and on the 5th two others were taken. They were washed from the bottom mud and vegetable debris and like those in the laboratory showed scarcely any signs of life. They gradually died without producing adults. By this time the water in that portion of the swamp which supplied us with larvae was so completely run off in consequence of drainage operations that further observations in this place were precluded. Mr. J. T. Brakeley, of Lahaway, however, was able to continue his studies throughout the season, getting his material from the pool in which eggs were first discovered in 1907. These notes now in the hands of Professor Smith will be collated and published in the Report of the New Jersey Experiment Station for 1908.

Mr. Brakeley collected the first pupa on May 28th and on the 31st of that month three others were taken. From these he secured three male adults on the 1st and 2d of June, his pupae having been apparently more advanced than those collected by myself and therefore maturing in spite of unnatural conditions. Additional pupae were collected at intervals throughout June and July, some producing imagoes, others failing to do so.

From what has been observed it is certain that the pupae never come to the surface for air as do the other forms of *Culex* (sens. lat.) of which the early stages are known. It is almost equally certain that the air tubes used in unity are inserted into the grass roots and like the larva oxygen is secured through the tissues of the plant. That these tubes are not permanently fixed in one position is shown by the fact that

they separate when immersed in alcohol, and that they can be independently moved at the will of the pupa has been demonstrated by Mr. Brakeley who has observed them with one tube projected through the surface film of the water and with the other propelling itself in a rotating movement around the first which served as a pivot.

An interesting fact in connection with the larva was also demonstrated by Mr. Brakeley when on July 31st he obtained a small lot of young wrigglers apparently in the second stage of development together with a full grown larva which clearly belonged to last year's brood. Thus is the record established of the continuous prevalence of larvae throughout the entire year. This had been previously suspected because of the capture of newly emerged adults from May to September.

EXPLANATION OF PLATE XXIII.

Fig. 1. Pupa of *Culex perturbans*, lateral view.

Fig. 2. Pupa of *Culex perturbans*, rear view, showing convergence of air tubes.

Fig. 3. One of the air tubes highly magnified.

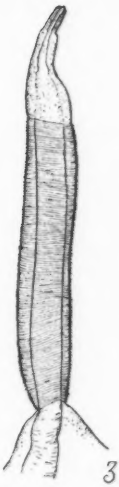
Fig. 4. Swimming paddles of pupa.

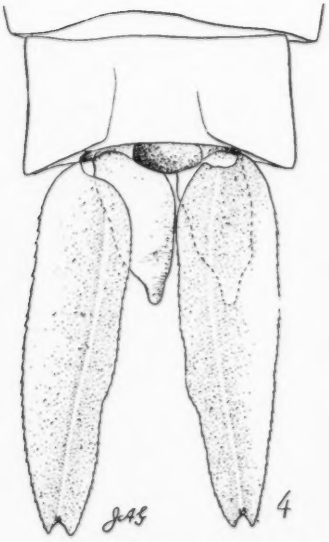
The Life-History of Lycaena antiacis Bdv., with other Notes on other Species.

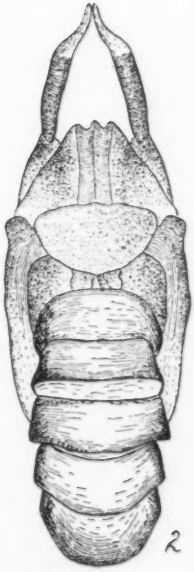
By FRANCIS X. WILLIAMS, San Francisco, Cal.

The fact that *antiacis* has exactly the same habitat as *xerces*, and that there are immediate forms making nice stepping stones between the two would leave no doubt to my mind that they are one and the same species. However, being desirous of further satisfying myself on this point, I reared a number of larvae which, at different periods in 1908, proved to be all *antiacis*. I am still satisfied however that *xerces* is dimorphic, *antiacis* being the other form, and that this dimorphism may be dependent on weather conditions. A good series of the two will show from the under surface of the wings, not only intermediate forms, but aberrations as well; whereas viewed from the upper surface the two insects are indistinguishable.

Xerces is easily recognized from the under side of the wings







GROSSBECK ON CULEX PERTURBANS.

by the large white unpupilled or scarce-pupilled spots. The underside may be light gray to dark stone color, usually darkest in the females; and the basal area and inner margin of the secondaries plentifully sprinkled with greenish scales, and clothed with long white hairs. There may be a white dash, plainest on the primaries from the discal arc to the base of the wings. Above in the male, the color is lilac blue, with usually a rather wide black border. The female is dusky, with blue scales about the base of the wings.

Antiacis (from San Francisco) is the same above as *xerces*. Below, the white spots form a wide margin to the black pupils, which may be quite small, especially on the secondaries, or quite large and more or less reniform on the primaries. The form *mertila* is *antiacis* with the white dash from the discal spot to the base, and with small black spots on the secondaries. The insect figured in Wright's "Butterflies of the West Coast" as *mertila* apparently lacks the white dash to the discal spot (a character of *mertila*), and is therefore not *mertila,* but *antiacis.* I have a female *xerces* in my collection with four of the seven white spots on the underside of the primaries unpupilled, and the pupils on the secondaries are almost obsolete. Several other specimens in my series show these white spots with their pupils becoming obsolete. A male *antiacis* which I possess has two indistinct, unpupilled white spots below on the right primary, none at all on the left one, and but four (pupilled) spots on each of the secondaries. It is very plain therefore that these "blues" are subject to much variation, and this has not been sufficiently considered.

Lycaena behrii, as described by Edwards, is typically represented in a "blue" frequenting the San Francisco Bay region, but is not found within the city and county of San Francisco. This insect is also lilac blue, but the lilac tint is not so strong as in *antiacis* and *xerces.* It differs also from these two in the form of the wings; in *behrii* they are more rounded, therefore blunter, and of greater breadth. The female *behrii* is duskier than that of *antiacis* and *xerces,* and has little if any blue at the base of the wings. On the underside the wings are "uniform dark brownish-gray" as described by Edwards, with the

black spots more narrowly encircled with white and usually larger than in *antiacis*. The ground color underneath is usually much more uniform than in the latter, less plentifully sprinkled at the base of the wings with metallic scales, and not having the suffusion of white markings occurring both in *antiacis* and *xerces*. Like them however it is a spring butterfly, flying in March and April, and sometimes even in February. It seems to me that *behrii* is a distinct species and not a variety of *antiacis*, for it can be readily distinguished from the latter in the adult and larval state, and also by its habitat. I have not taken *behrii* in northern central California, but a form quite distinct but closely allied to it. It flies a good ways south of San Francisco, but I have not taken it in Monterey county, about a hundred miles south of the city where there is a "blue" very close to if not identical with the southern *L. polyphemus*, figured in Wright's book as *antiacis* but quite different from the latter.

Lycaena xerces is said by Boisduval to inhabit the Yuba Mountains ("Montagnes de la Juba"); this appears unlikely, but cannot be discredited until that region is well explored entomologically in the proper season. It may fly locally in Marin Co., north of San Francisco. Both *antiacis* and *xerces* were formerly quite abundant in the Western Addition of the city; and this is where most probably *xerces* now in collections come from. Here however it is nearly extinct, owing to the progress of civilization, but it is still present as a small colony in a limited area on the hills near the ocean, at the southern boundary of the city and county of San Francisco. It is found not on the sand dunes proper, but about sandy soil with rather low and scant vegetation, where its food-plant, *Lotus glaber* grows. *Xerces* always flies with *antiacis*. The latter is given a wide range, but as far as I can ascertain, it is not the same species of *antiacis* of other states or of other parts of this state. There remains much to be done in this group, as anyone can see who has a good series of these insects.

Lycaena antiacis.

Egg.—Of the usual echinoid form, depressed at the top; micropyle in a pit. A raised white net-work, the meshes quadrilateral, and sur-

mounted at each angle by a short rounded process, somewhat obliterates the delicate pale green ground color. Diameter about .65 mm.

With few exceptions the egg is strongly glued to the dorsal surface of a leaf (rarely terminal) of *Lotus glaber*, a prostrate legume common in sandy soil. Though several eggs are sometimes found on one leaf, each was probably laid by a different female.

First instar.—The larva in escaping from the egg eats a large ragged hole out of the top, but consumes no more of the shell.

Head of moderate size, blackish, and retracted under the first segment; body in freshly hatched larvae of a pale yellowish green; oblong, and somewhat ridged, and covered with minute dark green granulations, and bearing smooth conical, brown tubercles which give rise to rough, translucent whitish hairs arranged as follows: A double row on each side of the median line, the inner hairs the longest, some three-fourths the width of the body; three infra-spiracular hairs on each segment, the middle one the longest; and a row of short clavate supra-stigmatal hairs. Cervical shield pale gray, with minute hairs. A sort of plate, possibly an osmaterium dorsad on the fused ultimate segments. Length at commencement of instar, 1.5 mm. Later in instar larva becomes darker, and the various bands are indicated.

Second instar.—Body plum color; median (heart) line of a darker plum, with a bordering band of dull lilac. Oblique latero-dorsal dash on segments, dull lilac, then below, two indistinct bands of the same color, and finally the dull lilac lateral band. Long hairs as in instar I, and in addition short whitish pile. Length at commencement of instar 3.5 mm. At the end of the instar the pattern becomes more distinct, and the larva assumes a dull green, or more rarely a dull gray color. The dull green larva has a dark green median band (brownish on seg. 2), with a yellow or yellowish-green bordering band. The oblique dashes and the two following bands are rather indefinite, and the pale lilac lateral band has a darker ventral border. The dull gray larva has darker markings. Cervical shield gray. Length at end of instar 5.3 mm.

Third instar.—All markings much plainer now. General appearance gray, median line purple, bordering band whitish yellow; oblique dashes lichen gray, the following sub-horizontal and horizontal bands of the same color; lateral band pale lilac with yellowish tinge, darker at its edges. Dorsal plate (?) on seg. 10, and a pair of whitish eversible spiny bulbs on seg. 11. Length at commencement of instar 6.75 mm. At end of instar the larva is of a delicate pale green (sometimes yellowish-green) color; median line dark green, bordering band yellowish-green, fading out at segment 10, the median line going beyond; oblique dashes (which proceed dorsad anteriorly and form an acute angle with the median line) pale green, and indistinct after seg. 10. The band following the oblique dashes is sub-horizontal, and the next

horizontal. Both are pale green and indistinct. Lateral band pale creamy yellow. Head small; blackish; legs pale brown with a pale green band along their base. A well-marked dorsal ridge. Length 9 mm.

Fourth instar.—Length at commencement of instar about 9.3 mm. Piliferous tubercles whitish; some smaller dark tubercles present. At the end of the instar the body is pale green; median line dark green, broad bordering band yellowish-green, oblique dashes distinct, yellowish-green, the following sub-horizontal and horizontal bands of the same color but more obscure, the whitish spiracles running along the upper edge of the latter band. Lateral band yellowish-white, ventrad becoming indistinct pale lilac, present on all the segments, plainest from seg. 2-10, and of a pale green color around the last segments. A pale greenish-yellow band on four prolegs. A long transverse plate (?) on seg. 10, with some dark tubercles. Eversible sacs whitish. Long hairs on each side of dorsum, some laterad and others on the sub-lateral fold. There are some small dark piliferous tubercles especially anteriorly, and the whole body is covered with a whitish pile. The larva is slug-shaped, with the posterior portion flattened, the segmentation is distinct, and the small black head usually deeply inserted into the apparently horizontal first segment. There is a distinct dorsal ridge, and some depressions along the sides of the body. Length 15. mm., width 4.75 mm. There is color variation here as in the preceding stages; the larvae are sometimes greenish yellow, while those reared in tin boxes are more brightly marked than those taken in the field (on which specimens the descriptions are made), being of a more lilac tone.

Pupa.—Stout; venter nearly straight; dorsum rounded; thorax and wing covers pale grayish green; abdomen pale wood brown, minutely reticulate; median line appearing through cuticle as a rough rusty-brown line, broad on the abdomen, narrow on the mesothorax, where it is nearly black, and wide again and dark on the wood-brown prothorax, where it diffuses along its margin heavily anteriorly and laterally. A very fine greenish line runs through the dorsal line of the thorax. A latero-dorsal brownish-black blotch on the anterior portion of the mesothorax, and just lateral of this a roughened shoulder blotch. Another dusky patch in the basal angle of the primaries, and a more compact one on the first abdominal segment in the angle of the secondaries. Abdomen in strongly-marked specimens has the pale dorsal area emphasized by the dusky subdorsal to ventral reticulations and blotchings; in paler pupae the dorsum is not well differentiated from the rest of the abdomen. On segs, 2-6 of abdomen are latero-dorsal depressions their centers ringed with black. Spiracles brownish, and on segs. 5-8 in pale yellowish-brown areas. A smooth transverse slit on dorsum of the seventh abdominal segment. Head pale wood-brown with antennae, maxillae and wing-veins peppered or blotched with dusky. A

few short hairs on stigmatal areas of segs. 6 and 7 of abdomen and on venter of the last two (fused) segments. Length 10 mm., width at seg. 3 of abdomen, 5 mm. Some pupae are quite pale, the general color being gray-green; others are quite heavily marked.

Antiacis larvae bred in tin boxes transformed to pupae about forty-eight days after hatching from the egg, or from early April to the end of May. Mature larvae obtained in the field did not pupate until the first part of June or even later. The younger larvae merely bite pits into the leaves, but older ones will devour the leaf entire. Though *Lotus glàber* is the usual food-plant of this "blue," I have found one larva of *antiacis* on *Lupinus arboreus,* and they will readily devour the leaves and pods of *Lupinus micranthus* and *Astragalus menziesii.*

Several days before pupation the larva loses its clear color and markings and assumes a dull sea-green shade, or more rarely becomes dull bluish-green, and semi-transparent in either case. It is now somewhat shortened, and choosing a convenient surface, spins a mat of silk where it later girdles itself for pupation. The silken girdle is rather weak, and where it joins the mat on either side the several strands are commonly united into one thread, but usually break up into several near the dorsum of the insect, so that it is wide in that region. In the larva, this girdle, starting from the mat at about the second abdominal segment, proceeds anteriorly and dorsally so as to support the third thoracic segment. Three days after girdling it sheds its exuvium and becomes a pupa. The larger hairs of the larva dry up and lie appressed to its body, and the latter in assuming the shape of the pupa becomes somewhat constricted in its middle. The larval skin, tightly drawn over the thorax, is loose and wrinkled over the abdomen. It splits on the thorax as in other larvae and exposes the pallid pupa, which in time assumes its proper shade.

By the beginning of June, I had about twenty pupae from which I obtained sixteen butterflies, nine males and 7 females. They were all *antiacis,* though several had the white dash of *mertila.* With one exception they came out quite late as compared with *antiacis* in nature, emerging from the end of April

to the 7th of July. The exception came out in midwinter. The pupae were kept most of the time in a warm dry room.

Three hymenopterous parasites were found preying upon the larva, and they all emerged the same season. One, presumably a braconid, spun a bright yellow cocoon but the adult escaped unobserved. But one larva parasitized each caterpillar, as was the case with the other two species. A single specimen of an ichneumon was reared from a pupa, but the commonest of the three parasites pupated within its host, when the latter was at the end of the third instar. Before pupating, the parasite in the now dead and elongate larva securely fastens the latter to some object by piercing the exuvium below the head and cementing it through this aperture with some secretion. But the perfect insect makes its escape not through the anterior portion of the skin, but through a hole in the dorsum of the

Fig. 1.

Fig. 2.

posterior end. Fig. 1 represents a larva of *L. antiacis* two days prior to pupation; Fig. 2 dorsal view of a pupa of the same.

Lycaena behrii.

Mature larva.—Head black; body very pale coffee color; still paler below the spiracles; median line reddish brown, with a purplish tinge. Pattern similar to that of *antiacis,* the oblique dashes whitish, the sub-horizontal and horizontal bands more obscure, all three being visible from segs. 2-9. Lateral line white, purplish ventrad. Long, pale, roughened hairs on body, longest dorsad and laterad, and of a darker shade on seg. 1. Shield grayish green. Length 15 mm., width at seg. 7, 5.7 mm. Another mature larva of this species is darker in color than the preceding, and is pale greenish sub-laterally; the median line blackish spotted, with a greenish tinge, broadest and purplish on seg. 2 and invisible on seg. 1, where its course is indicated by a few piliferous dots; bordering band paler than dorsal ground, oblique dashes and two following bands pale drab, the lowest with a greenish-

gray tinge; lateral band also pale drab, with a pale purplish dorsal border.

This is a broader larva than *antiacis*, and of a different ground color, lacking entirely or in part the pale green of the former species.

Pupa.—Similar in size and form to that of *antiacis*, but the ground color is darker, being wood-brown with paler meta-thorax and wing-covers. The distribution of markings is the same as in *antiacis*, but more obscure, thus giving it a more uniform coloration.

The eggs and larvae of this insect were taken in Marin Co., on the small annual blue lupine (*L. micranthus*). The eggs are laid on the flower buds, or more rarely on the young leaves. The larvae feed upon the tenderer parts of the plant, and when of large size eat through the wall of the pod and devour the seeds. They are not very particular as regards food-plants and will readily eat *Lotus glaber, Astragalus,* and the large yellow lupine. The single pupa obtained (June 10th), 1907, disclosed a male on March 22, 1908.

Lycaena pheres Bdv.

This, like the following "blue" is an early summer species. It was first described by Boisduval, and its habitat given as the environs of San Francisco. This is therefore its typical habitat, and as the food-plant of the larva is *Lupinus chamissonis,* a large maritime blue lupine, true *pheres* is to be found near the sea in the vicinity of these plants, which are common on the sand dunes. No larvae of this blue were reared, but the females were observed ovipositing on the densely tomentose stems of the lupine, some distance below its summit, but always in the vicinity of young leaves and sometimes upon them. The insect flies in May and early June.

There is undoubtedly some confusion as to what *pheres* really is, and it is probable that it has a more restricted range than it is accredited with.

Lycaena icaroides Bdv.

Common in the region about San Francisco, having the same habitat as *behrii,* but appearing much later. The larva likewise feeds upon *Lupinus micranthus,* but it could not be induced to eat other legumes.

Pemphigus tessellata: Alternate Host, Migrants and True Sexes.*

By Edith M. Patch.

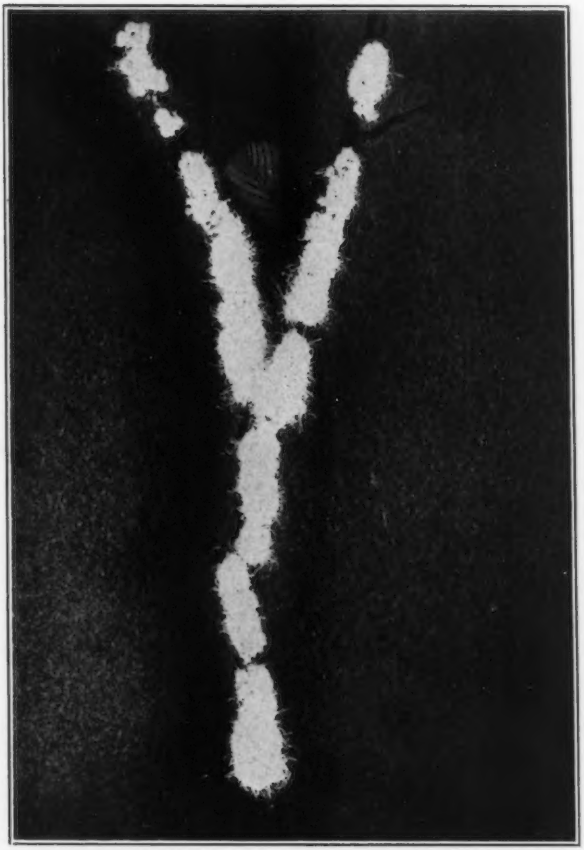
(Plate XXIV)

Ever since Fitch recorded in his brief, original description in 1851 "I have searched in vain for winged individuals of this species," the alder blight has been from time to time an object of speculative interest to aphid observers, although if any real attempt has been made to trace the flight of the migrants and locate the winter eggs it has been heretofore unrecorded.

With a species so conspicuous and of such wide distribution, the absence of a knowledge of its different stages for the half century or more since it was described would seem strange were it not that the species certainly gives as defiant a dare to the life history detective as a *Pemphigus* can and that is saying a good deal.

To begin with there seems to be no place in the apparently closed cycle of alder blight for an alternate host and winter eggs. According to the observations of the writer for the past five years, apterous viviparous forms of *Pemphigus tessellata* are present on the alder branches (*Alnus incana*) from about April 20th to late October, weather permitting, and the rest of the year hibernating as young apterous viviparous forms in clusters or singly among the fallen leaves at the base of the alder. The return of these hibernating young to the alder branches in the spring completes an apparent cycle for a single host plant and certainly suggests no need for variety in diet. It was not then with any thought of an alternate host that these observations were begun for this species in Maine but with the hope of finding at some time during the year a sexual generation upon the alder. Protected under the flocculent mass secreted by this *Pemphigus* the presence of a winged generation is not revealed (unless special collection and search for forms with wing pads is made) until the form is mature. From late August until the middle of September at the same time the

* Papers from the Maine Agricultural Experiment Station: Entomology, 30.



PATCH ON PEMPHIGUS TESSELLATA.

Showing masses of alder blight, containing both mature and apterous viviparous forms and migrants already winged and ready for flight.

last apterous viviparous generation is maturing and bringing forth an excessively numerous progeny which winter among the leaves on the ground, a generation of large winged forms appears upon the alder stem in flocculent masses containing sometimes a few apterous forms and sometimes in clusters where the apterous forms are the more numerous.

These winged forms take flight without producing young upon the alder, and early in September in those seasons when the species is particularly numerous the flight of this *Pemphigus* is so considerable as to give the appearance of a slight snow storm in the air. The bodies of the migrants are dark but the wings are whitish and powdered and much of the flocculent wax is retained upon the abdomen even in flight.

One such flight was noticed September 1, 1905 and several in late August and early September, 1908. On account of the excessive numbers of syrphus maggots and the larvae of the wanderer butterfly, *Feniseca tarquinius** in 1906 the alder blight was nearly exterminated in the vicinity of Orono that season and during 1907 the colonies were not plentiful. This present season, however, they are again numerous and at the time of their flight a winged *Pemphigus* was seen to be congregating in conspicuous numbers upon the trunks of maple on the campus, particularly *Acer dasycarpum* Ehrh. and the ornamental cut leaved maples. Microscopic examination showed no distinction between the Pemphigus newly alighting upon the maple trunks and these taking flight from the alder and it was with intense interest that the following observations were made.

August 27, 1908. Winged viviparous *Pemphigus* covering the trunk of cut leaved maple. They are seeking the crevices and rough places in the bark and are making no attempt to feed.

August 28, Pieces of bark torn back from maple trunk show the winged viviparous *Pemphigus* and their numerous progeny, minute forms which under a lens prove to be the sexual forms, many of them being in copulation.

August 28. Winged *Pemphigus tessellata* removed from alder before flight and placed in cage upon twigs of maple

* Me. Agr. Exp. Sta., Bul. No. 134, pp. 216-217.

in laboratory. They settled contentedly upon the twigs. August 30. The progeny of winged *P. tessellata* placed on the maple twigs in laboratory are sexual forms proving upon microscopic examination to be exactly like those collected from under bark of maple on campus.

September 3. Numerous yellow eggs are present under bark among the *Pemphigus* on maple trunks on the campus.

September 4. *Pemphigus tessellata* numerous on wing and observed floating in the air on campus. Individuals were watched and seen to alight on the maple bark where they settled and sought rough places in the bark.

* * * * * * * * * * *

We have, then, unquestionably the oviparous females and males of *Pemphigus tessellata* deposited upon maple trunks by the winged migrants from the alder and the eggs of this species deposited under the bark of the maple. Coupled with the fact that *P. tesellata* hibernates also in the young apterous viviparous form among the leaves at the base of the alder clumps this would seem rather to complicate matters than to prove a missing link.

On the basis of these observations it seems safe to hazard the following guess as a working hypothesis. *Pemphigus acerifolii* Riley, a flocculent species on maple leaves is very common from spring until mid July. A winged generation then appears and disappears. *Pemphigus acerifolii* has been known only upon the maple leaf,—the rest of the cycle never having been recorded. With this in my mind my aphid notes were searched for these two species with the following suggestive coincidence:

"No. 19-05. *Pemphigus acerifolii* Riley, Orono. July 15, 1905. Winged forms present in great numbers on leaves of maple along river. Ready for migratory flight."

"No. 30-05. *Pemphigus tessellata.* Orono. July 18, 1905. Single viviparous winged forms scattered about on the alder leaves (mostly on under side), followed by a group of young apterous viviparous forms present on the alder branches in great numbers, producing young."

The foregoing record of viviparous *winged* forms on the alder leaves at the time it was taken seemed puzzling, as no

pupae, or individuals with wing pads, could be found on the alder tree; but in the light of this fall's observations there seems little reason to doubt that these sporadic winged forms on the leaves of the alder are the return migrants from the maple, and that *Pemphigus acerifolii* Riley is merely the maple name for *Pemphigus tessellata* Fitch, the stem mother of which migrates from the bark to the leaf upon hatching in the spring.

In accordance with my custom for five years, specimens of aphids have been saved, for every record made, either in balsam mounts or as alcoholic material, so that they are ready for reference at any time. During the winter of 1905-06 I made a careful comparison of all the winged species of *Pemphigus* taken in Maine up to that time, and was particularly struck by the fact that mounted specimens of *P. tessellata* and *P. acerifolii* were indistinguishable and made the grumbling comment "If these are two species there is no structural basis for systematic work with Pemphiginae." However, there seemed no place in the *tessellata* cycle for *acerifolii,* several attempts to colonize maple with apterous forms of *tessellata* were entirely unsuccessful and for the next two falls the species was so scarce that the migrants were not much in evidence, and no clue was forthcoming until this fall.

The life cycle of the alder blight is by no means solved by the location of the sexual generation. The true association of *P. tessellata* and *acerifolii* yet remains to be established upon the alder. With the clues now at hand these species (two or one) can unquestionably be traced in time. The abundance of alder and maple at Orono and the usual presence in great numbers of *P. tessellata* and *acerifolii* make it an ideal situation for work with these forms and favor my plans for thorough study of the *Pemphigus* upon the alder and maple.

There is no need of crowding with further details from notes now at hand this preliminary paper, the object of which is merely to place the sexual forms of *P. tessellata* for which the following brief description will suffice.

Oviparous female.—A pale yellowish form, apterous and non-rostrated, measuring 1.33 mm. in length. Antennae of

four segments. Two eyes with three separate dark globular pigmented masses. Abdomen ovoid. Deposited by viviparous migrant from alder, in crevices of bark on trunk of maple. Shortly after birth this form sheds a thin white membranous skin which commonly adheres to caudal tip of abdomen. After copulation the female deposits a single large egg.

Male.—Darker than female and greenish. Apterous and non-rostrated, measuring .68 mm. in length. Antennae of four segments. Two eyes with pigmented area in one large irregular mass. Abdomen linear. Sheds skin after birth as does the female. This form is smaller than the egg it fertilizes.

Egg.—Comparatively large egg filling most of the abdomen of the female and measuring about .83 mm. It is yellow and glistening and deposited usually with a downy white secretion.

Notes on an Orthopterous Leaf Roller.

By W. L. McAtee, U. S. Biological Survey.

(Plate XXV)

Under a title, by prefixing two words to which, I have formed that of the present article, Mr. A. N. Caudell in 1903 described* some exceptional habits of *Camptonotus carolinensis* Gerstacker. While I have but little, I fear, to add to Mr. Caudell's excellent account, the accompanying photographs will, I hope, prove welcome, especially since one of them, in a way, illustrates his article as well as my own.

On August 2, 1908, while collecting insects on Plummer's Island, Md., in company with Mr. E. A. Schwarz, a heavily fruited specimen of the bladdernut (*Staphylea trifoliata* L.) attracted my attention and I proposed that we examine it for insect work. A brief inspection showed that a great many of the swollen triangular pods had rather large irregular holes in them. Mr. Schwarz, in opening one, disclosed a locustid which escaped, but not before I recognized it as *Camptonotus*. A minute later, discovering another, I succeeded in keeping it in its lair, one of the 3 roomy cells of the bladdernut, in which

*Proc. Ent. Soc., Wash. Vol. VI. pp. 46-49. 1904.

it was snugly curled, the long antennae, to my surprise, being completely withdrawn. These two were all that could be found on the bush. On August 15, Messrs. Schwarz and Knab looked over this bush again, and collected all of these locustids they could find. The next day I examined the same individual shrub and captured two more, which indicates that in all probability the insects change quarters frequently and that one night is sufficient time for them to become comfortably installed.

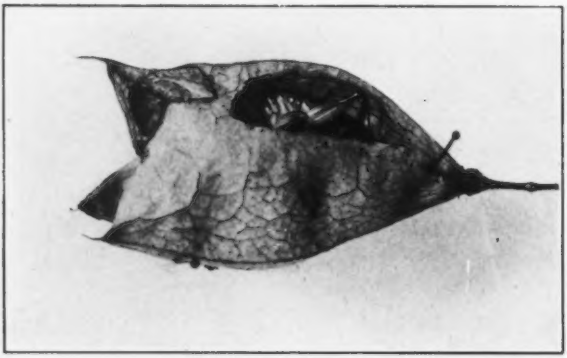
On the same day an extended search, covering several bushes of *Staphylea,* revealed *Camptonotus* in numbers. I collected eight and could easily have secured a score. Three of the eight were males, which, heretofore, have much more rarely been collected than females. Carefully examining the first pod in which a *Camptonotus* was found, it was seen that as usual, a large irregular opening had been made in one of the cells, but it had been closed by a loosely constructed door, composed of bits of the pod and a network of fine spun silk-like threads. The locustid was visible within and scuttled about when the pod was handled, but did not attempt to bolt out like the first ones found, which probably were not spun up. Several other pods were found to be similarly inhabited. In some the opening had been closed by a well woven continuous sheet (see middle figure, Plate XXV). Apparently nothing in the pods was eaten, they serving only as shelters.

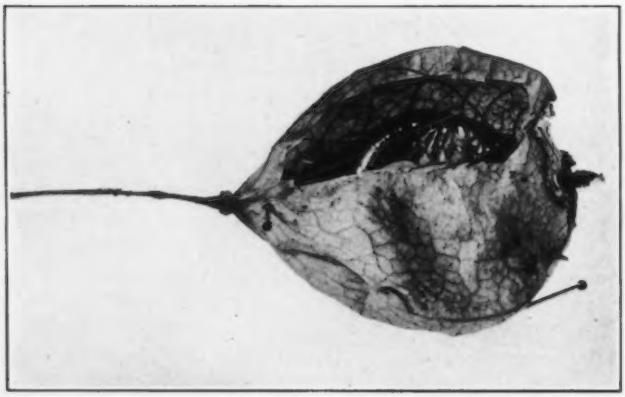
Some specimens of *Camptonotus* and twigs of *Staphylea* were brought home and the twigs placed in water under bell jars. In a large jar two females and one male were confined with a twig bearing several entirely uninjured pods and many leaves. They were watched for some time by a light but did nothing with the plant. They sometimes moved nervously about, sometimes sat motionless, but they also spent much time cleaning all accessible parts of the body (even including the ovipositor in the case of the females), with the mouth. During this process they showed wonderful control of the long antennae, which after being pulled down one at a time by the fore legs, by great muscular power at the base were slowly

drawn between the mandibles for their whole length. The dexterity with which they manipulate these seemingly unwieldy appendages (which are about five times the length of the body), leaves the observer in no doubt as to how they stow them away in the cramped confines of their improvised retreats. Leaving the locustids in darkness for a while, no change was noticed upon returning, except that the male had ensconced himself in his old cell in a pod that has been left lying on the floor of the receptacle. From it he was reluctantly dislodged. They were then left for the night.

In the morning it was found that both females had made cells for themselves, not however in the pods, but in leaves. Each had neatly rolled up a leaf, after making an oblique (with reference to the midrib) cut on one side near the petiole end. (See top figure, Plate XXV). At or near their edges the two halves of the leaf were bound together by fine silk-like strands, and I was fortunate enough to see one of the females finishing her work, she being inside the pocket. The thread flowed from between the points of the mandibles, they, the palpi, and in fact the whole mouth mechanism moving incessantly. The head was swung from side to side, and the mandibles merely touched to a spot, first on one flap of the pouch and then on the other, to which the thread immediately adhered. Rather an elaborate web was made across the more open upper portion of the pouch, but a passageway was left open.

Later in the day, while I was necessarily absent, my wife observed the male making a pouch. Only through her watchfulness am I able to give an account of this interesting process. The male, be it remembered, did nothing throughout the night, and he was further inactive till about 10 A. M. For an hour he had sat motionless on a leaf (which had a ragged indentation almost reaching the midrib near the tip), when at seven minutes before ten o'clock he turned facing the apical end, grasped the edges of the leaf with three legs on each side, pulled them toward each other till they were separated by a space of only about a quarter of an inch, and immediately began to run lines from edge to edge. Backing a little, more





McATEE ON CAMPTONOTUS CAROLINENSIS GERSTACKER.

threads were spun, then the insect went to the tip end, crawled into the tube he had just formed, and began to bind the edges together on the inside, at the petiole end, then returning to the apical end, then worked at the middle, rested, and finally spun in the open place near the mouth of the pocket. The sides were noticeably drawn together as he worked near the middle on the inside. Also, when the insect crawled over the first work done, while still on the outside, the edges were squeezed nearer together by the legs, and were held there, the threads becoming more oblique. The whole process was finished 2 minutes before ten. After completing the pockets the insects lie very quietly within them for hours. The work done by these captive *Camptonotus* indicates that they have no choice as to whether the mouth of the pouch shall be at the apex or base of the leaf. Their adaptability is shown by the use of a leaf weakened by injury, obviating the necessity of making a cut, as well as in the recognition of the pod of *Staphylea* as a handy substitute for a rolled leaf.

Although three specimens of *Camptonotus* were confined for two days with uninjured pods and no leaves, not a pod was disturbed. Hence it is not proven that the locustids enter them through openings of their own making. Nevertheless, it is very probable that they do so; certainly they have mandibles equal to the task. The pods may be used for only a short period. At any rate, on August 23, not a *Camptonotus* could be found where a week before they were numerous. However, on this date two specimens of *Orocharis saltator* Uhler, were discovered in torn pods. Mated pairs and nymphs of *Banasa* also were frequently found.

EXPLANATION OF PLATE XXV.

Top Figure: Leaflet of *Staphylea trifoliata,* rolled by *Camptonotus carolinensis.*

Middle and Bottom Figures: Pods of *Staphylea,* with walls of cell cut away, showing *Camptonotus,* ensconced within. On upper left hand part of middle figure, note well woven sheet closing the entrance to cell.

MR. FORDYCE GRINNELL, JR., collected last summer in the San Jacinto Mountains of southern California. Messrs. Grinnell and Bradley made a collecting trip to the summit of Mount Wilson in September.

ENTOMOLOGICAL NEWS.

[The Conductors of ENTOMOLOGICAL NEWS solicit and will thankfully receive items of news likely to interest its readers from any source. The author's name will be given in each case, for the information of cataloguers and bibliographers.]

To Contributors.—All contributions will be considered and passed upon at our earliest convenience, and, as far as may be, will be published according to date of reception. ENTOMOLOGICAL NEWS has reached a circulation, both in numbers and circumference, as to make it necessary to put "copy" into the hands of the printer, for each number, three weeks before date of issue. This should be remembered in sending special or important matter for a certain issue. Twenty-five "extras," without change in form, will be given free, when they are wanted; and this should be so stated on the MS., along with the number desired. The receipt of all papers will be acknowledged.—ED.

PHILADELPHIA, PA., DECEMBER, 1908.

We not infrequently receive lists of species of insects for insertion in this journal that are hardly worth publishing and we also publish some that are hardly worth the room they take up. Our object in doing this is to encourage the writers and also in the hope that the lists may contain the names of some insects that will be of use in showing distribution later on when such matter is collated. The people who send these lists go out and turn over a few logs and pick up the conspicuous, common and widely-distributed forms and generally overlook the species peculiar to the district. In other words, they are too superficial in their work and do not wait until they can send in a list that is complete enough to be of value. Some time ago we received a sending of Diurnal Lepidoptera from Arizona and strange to say the box did not contain a single species that is not found in Pennsylvania. We recognize the great value of faunal lists when they really represent the locality or district where they are taken and we are glad to publish them as space permits. On the other hand a list that is only a surface skimming and contains the names of species that get in the way of the collector and are found from Winnipeg to Tampa and from Cape Cod to the Golden Gate is scarcely worth while.

THE entomological societies of New York, Brooklyn and Newark gave a dinner at the Imperial Hotel, Brooklyn, on November 21st in honor of Professor John B. Smith, State Entomologist of New Jersey, who on this date celebrated his fiftieth anniversary.

Notes and News.

ENTOMOLOGICAL GLEANINGS FROM ALL QUARTERS OF THE GLOBE.

MR. A. F. SHULL is now at Columbia University.

MR. HENRY L. VIERECK is now connected with the Park-Davis Co., at Detroit, Mich.

MR. LEONARD HASEMAN has been appointed assistant in entomology at Cornell University.

MR. CHESTER JARVIS, of the Storrs' Connecticut Exp. Station is spending a few weeks at Cornell University.

PROF. C. F. BAKER has returned to the United States and will teach in Pomona College at Claremont, California.

PROF. GLENN W. HERRICK, formerly of the Mississippi Agricultural College, is now located at College Station, Texas.

DR. J. A. NELSON is conducting investigations on the embryology of the honey bee for the U. S. Bureau of Entomology.

DR. A. FENYES, of Pasadena brought back from Cordoba, Mexico, this summer a very fine series of Coleoptera, especially Aleocharinæ.

THE following species taken this year are new to me: *Cyaniris ladon, Thorybes pylades, Nathalis iole, Papilio glaucus.*—F. M. HOLMES, Prescott, Iowa.

MR. A. G. HAMMAR, formerly of Ithaca, N. Y., has recently been engaged in the investigation of grape insects at North East, Pa., for the U. S. Bureau of Entomology. He has now returned to Washington.

PROF. E. B. POULTON, of Oxford, England, is one of the invited speakers at the Darwin Celebration, convocation week, in Baltimore. He will also give the annual address before the Entomological Society of America.

C. F. ADAMS, A.M., M.D., Professor of Entomology, has been appointed Acting Dean and Director of the College of Agriculture and Agricultural Experiment Station, of the University of Arkansas at Fayetteville.

C. W. HOWARD, A.B., F.E.S., has resigned his position of government entomologist of the Transvaal to become Chief of the Division of Entomology of the government of Portuguese East Africa. His address is box 255, Lourenco Marquez, P. E. A.

AT THE St. Louis Exposition, New Jersey had an interesting exhibition of mosquitoes, showing not only the different species and their life-histories but also the natural enemies of mosquito life. While I was looking over this collection, two ladies approached it, one of them reading aloud the placard, "New Jersey Mosquito Exhibit." They stood gazing down into a case of large dragon flies for a few moments, and then one exclaimed, "Dear me, I'd heard of New Jersey mosquitoes, but I'd no idea they were as large as that."—F. M. HOLMES, Prescott, Iowa.

Doings of Societies.

At the meeting of the Feldman Collecting Social held September 17, 1908, at the residence of Mr. H. W. Wenzel, 1523 South 13th Street, Philadelphia, seventeen members were present, also Mr. O. T. Elleder of Russia, Mr. W. S. Fisher of Highspire, Pa., and Mr. R. Pearce of Philadelphia, visitors.

Prof. Smith spoke of the spread of *Daremma catalpae* Bois. throughout the State of New Jersey and its great abundance during several years. In 1906 it began to lessen in numbers in the regions that were first invaded, and parasitism became more obvious. In 1907 this tendency became even more marked, and during the season of 1908, the larvae were really rare in most parts of the State, parasites seeming to have caught up with the species, and brought it under control. He also spoke of other natural controls of injurious species and expressed his opinion that no one kind of check was controlling for all species, that diseases in one case did what parasites did in another, and that weather conditions were often as important as either, acting independently or with one or both the other factors. Some cases of hyper-parasitism were also referred to as influencing the effect of the primary forms. Discussed by Mr. Viereck, Prof. Calvert and Dr. Skinner.

A letter from Mr. Roswell H. Johnson to Mr. H. W. Wenzel was read and specimens illustrating the color variation of *Hippodamia convergens-quinquisignata* group were shown.

Mr. H. W. Wenzel exhibited pieces of floor boards of second story of a club-house at Anglesea, N. J., which were infested with *Hylotrupes bajalus*. The work of the insect is invisible until the destruction is complete. Dr. Skinner spoke of a case of the same insect, where the damage done was not noticed until the piano had fallen into the cellar.

Mr. Elleder spoke about his collecting of Coleoptera in this country. He has been collecting in and near Philadelphia for about one year, and finds that many of the families are comparatively rare here. The *Cicindela* on the other hand are represented in all of Russia by only four species, while here they are very numerous, and he suggested that a *Cicindela* should be incorporated in the coat of arms of New Jersey. The gen-

us *Carabus* he finds poorly represented here; he also referred to a species of *Rhipiphorus,* probably *dimidiatus,* which he found in numbers at National Park, N. J. on *Monarda punctata.*

Mr. Harbeck said that he found *Rhipiphorus* species quite common at Trenton, N. J. this year.

Mr. H. W. Wenzel said that *Cychrus viduus* had been very rare for many years, until within last two or three years, since which time a few specimens have been taken in the vicinity of Philadelphia. The same speaker reported the capture of a pair of *Chlaenius prasinus* at Philadelphia on July 14th and 23d. This species was not known to the speaker from this locality, being a mountainous species.

Prof. Calvert exhibited a specimen of *Erebus odoratus,* which was found alive, resting on wall in room of Biological Hall, University of Pennsylvania, on August 27, 1908. On the same day a specimen of the same species flew into the window at the Academy of Natural Sciences. On this and the preceding day a storm said to have come from the Gulf of Mexico occurred.

Mr. Geo. M. Greene exhibited a block made of peat, used as a setting board for Coleoptera.

Dr. Skinner called attention to the fact that small species of insects from the tropics have been almost entirely neglected, and that these should be more studied.

Prof. Smith suggested that window screens should be painted with kerosene to prevent mosquitoes from coming in through the same, which, however, proves effective for a while only.

Mr. Viereck after having made further investigations with Culicid larvae in fresh water from the "Philadelphia Neck," found the most of the specimens to be *solicitans,* and some *pipiens.*

Mr. Charles Greene exhibited specimens of the following Diptera: *Ceraturgus cruciatus* Say, taken at Germantown, Philadelphia, July 2, 1908; *Heteropogon gibbus* Loew., Glenside, Pa., Sept. 1, 1908; *Myiolepta varipes* Loew., Roxborough, Philadelphia, June 7, 1908, by George M. Greene; *Trichopoda cilipes* Wied., Newtown Square, Pa., August 23, 1908, by

George M. Greene; and *Spogostylum cephus* Fab., Germantown, Philadelphia, July 2, 1908.

Dr. Castle exhibited two specimens of *Clerus quadrisignatus* taken at Linglestown, Dauphin Co., Pa., June 27, 1908.

Mr. Fisher said that he found the same Clerid very common at night, running around dead hickory trees near Harrisburg.

Mr. Daecke reported *Euaresta aequalis* Loew. very plentiful at Philadelphia on August 30th and September 5th this year, having taken twenty specimens in one sweep on clotbur, *Xanthium strumarium* L. while heretofore he had taken but two specimens, one of these at Baltimore, Md. Also the Geometrid, *Euchoeca albovittata* Guen. was very common this year, and particularly at Castle Rock, Pa., on May 26th. The same speaker reported the capture of *Atteva aurea* Fitch at National Park, N. J. on August 2nd and 4th, resting on *Asclepias cornuti,* which is probably a new record for the State; at the same place and date he found *Culex jamaicencis* very common. He also reported the capture of a specimen of *Bembex spinolae* with a *Tabanus nigrivittatus* in its grasp.

FRANK HAIMBACH, *Secretary.*

At the meeting of the Feldman Collecting Social held on October 22, 1908, at the residence of Mr. C. Few Seiss, 1338 Spring Garden Street, Philadelphia, fifteen members were present.

Mr. Laurent exhibited a breeding cage consisting of the old fashioned high fly trap, placed over a flower pot. The speaker stated that he had been very successful in rearing *Pamphila* larvae in these cages. Mr. Laurent also pointed out some deficiencies in certain naphthaline cones which have been recently placed on the market.

Dr. Skinner spoke of the great value of melted naphthaline as an insecticide for all household insect pests. Wherever insects hide in houses, due to defective woodwork or poor carpentering, naphthaline may be used with entire success. It melts at a very low temperature and on being poured into cracks or crevices sets immediately and hermetically seals them. It is most effective used this way against ants, roaches, fleas and bedbugs. Care should be taken to prevent flame coming in contact with the melted substance or the fumes as it is very inflammable.

FRANK HAIMBACH, *Secretary.*

A meeting of the American Entomological Society was held October 22, 1908, Mr. Philip Laurent presiding. Nine persons were present.

Mr. Daecke exhibited a specimen of *Argynnis cybele* enclosed in a Riker mount which had been partially destroyed by an *Anthrenus* though the mount was tight.

Dr. Skinner exhibited butterflies that had been mounted between sheets of mica 163 years ago. He also showed the male of *Plagodis schuylkillensis* Grossbeck, taken at the Falls of Schuylkill, Philadelphia in August.

Mr. Weigand reported having captured a new species of *Cucullia* in Fairmount Park, Philadelphia, on New England asters.

Dr. Skinner exhibited both sexes of *Trogolegnum pseudambulyx* Bd., a large sphinx moth taken at Real del Monte, Hidalgo, Mexico, by Mr. H. T. Van Ostrand. The sexes differ to a marked degree.

Mr. Hornig said he had recently seen a number of Odonata mating and asked if it were not late in the season for this.

Mr. Laurent remarked that he had *Pamphila hobomok* hibernate as egg, larva and chrysalis.

Dr. Castle exhibited a naphthaline cone covered with a paper cover to prevent soiling the box. A tuft of cotton was put in the small end of the paper cone.

The death of Dr. Wm. H. Ashmead on October 17th was announced. He was a corresponding member of the Society.

HENRY SKINNER, *Secretary.*

The June meeting of the Heink Entomological Club of St. Louis, Mo., occurred on the 20th at the residence of Mr. C. L. Heink, who presided.

Mr. Schroers spoke on collecting pupae of *Ecpantheria deflorata,* which, he said, are found only where logs or trunks of trees are infested with ants. His opinion is that the ants prevent the intrusion of parasites that might injure the pupae, which are themselves protected from the attack of ants by the silken web in which the pupae are encased.

Mr. Heink took the members through his "butterfly farm," a building he had erected with the sole purpose of rearing Lepidoptera. Instead of the usual breeding cages, he uses

twelve gallon carboys, cutting out the top so as to leave a circular opening about ten inches in diameter. A mixture of sand and dirt to a depth of two inches is then put in the bottom of the carboy. When in use, this is thoroughly moistened and the stems of the food plant are placed therein. The top is then tightly coved with wax paper. Whenever the moisture becomes excessive a screen is used to cover the top, instead of the wax paper. In this way the twigs retain their freshness for weeks, in fact, until every vestige of foliage has been consumed by the larvae.

AUG. KNETZGER, *Secretary.*

The September meeting of the Heink Entomological Club took place on the 12th at the residence of Mr. A. C. Kelbly, St. Louis, Mo., Mr. Heink in the chair. Mr. Julius Meyer was elected a member.

Mr. Kelbly exhibited a lot of Heterocera, comprising several hundreds of specimens, which he took at the electric lights of the West End Hotel. Among them are a monstrous pair of *Marumba modesta* and several varieties of *Apantesis.* Mr. Graf gave an account of his visit to Cliff Cave, five miles south of the city. He found no insects in the cave.

AUG. KNETZGER, *Secretary.*

The October meeting of the Heink Entomological Club occurred on the 31st at the residence of Mr. Schroers, St. Louis, Mo., Mr. Heink presiding.

Mr. Heink reported that while on a collecting trip to Cliff Cave last summer he saw a grasshopper feeding on parasites in the skin of a larva of *Dolba hylaeus* which was feeding on a pawpaw leaf.

Mr. Schroers exhibited an aberration of *Neonympha eurytus,* which he took at Cliff Cave. This specimen has two ocelli, placed side by side on the upper surface, near the anal angle of each secondary. The under surface of the wings is beautifully striated, while the arrangement of the ocelli differs from that of a normal specimen.

Mr. Kelbly exhibited a specimen of *Pyrameis kershawii* from Australia and a specimen of *P. cardui* taken here, which showed hardly a trace of difference in markings.

AUG. KNETZGER, *Secretary.*

The 26th regular quarterly meeting of the Pacific Coast Entomological Society was held on November 23rd, 1907, at the residence of Dr. F. E. Blaisdell, 1632 Post street. President Fuchs in the chair.

The Annual Election of officers took place with the following results: *President,* Dr. E. C. Van Dyke; *Treasurer and Secretary,* Dr. F. E. Blaisdell; *Assistant Secretary,* Leon Munier.

Mr. Edw. Ehrhorn made remarks of appreciation for the services rendered to the Society by the retiring President, Mr. Chas. Fuchs.

Mr. F. X. Williams reported the result of his collection trip to Siskiyou Co. during the last summer.

Mr. R. W. Doane reported some entomological work at San Diego, Calif. Also results in collecting there in April, stating that some interesting *Tipulidae* were taken. On foggy nights he found insects very abundant about arc lights. Mr. O. E. Bremner gave a talk on the White Fly.

Mr. J. C. Huguenin reported results of collecting Coleoptera in San Francisco Co. Mr. J. G. Grundel gave an account of his collecting trip to Eureka.

Mr. Ehrhorn spoke on the photographing of insects, and exhibited photographs.

Dr. E. C. Van Dyke then entertained the Society by reporting his recent trip to the Aleutian Islands. The results will be published later, when the material shall have been worked up.

Dr. Blaisdell exhibited several species of Coleoptera taken in Alpine Co., California. Among which were *Cicindela sierra,* showing variations in color from dark with a small apical lunule to the fully marked, bright green examples; *Deretaphrus oregonensis, Bius estriatus, Mycetina hornii, Liodes bicolor, Platycerus opaca* Fall, and *Quedius debilis.*

Dr. Van Dyke exhibited two boxes of Coleoptera from the Aleutian Islands, many not heretofore recorded from that region.

Dr. Blaisdell reported that the 24th and 25th meetings of the Society were not held on account of the car strikes.

F. E. BLAISDELL, M. D.
Secretary.

The 27th regular quarterly meeting of the Pacific Coast Entomological Society was held on February 22nd, 1908, at the residence of Dr. F. E. Blaisdell, 1632 Post street, President Van Dyke in the chair.

President Van Dyke delivered an address, reviewing the progress of Entomology on the Pacific Coast, after which Percy Baumberger presented a gavel to the President with a few appropriate remarks.

E. T. Cresson, Jr., spoke of the work done by Osten Sacken in the Seventies and also that of Pilate in Collecting of Diptera in Louisiana.

Mr. Edw. Ehrhorn talked on the parasites of *Phryganidia californica*, two new species being bred.

Chas. Fuchs reported a collecting trip to St. Helena and Placer Co.

Mr. F. X. Williams exhibited a box of Sesiidae. Mr. E. T. Cresson, Jr., and G. R. Pilate were elected to membership.

F. E. BLAISDELL, M. D.,
Secretary.

The 28th regular meeting or Field Day of the Pacific Coast Entomological Society was held at Muir Woods, Marin Co., California, on May 17th, 1908. Eight members and eight guests participated in the outing.

The Coleopterists collected the following interesting species: *Dendroides picipes, Platycerus oregonensis* and *agassizii, Megapenthes elegans, Ernobius* sp., *Phymatodes aeneus, Pterostichus scutellaris, Bembidium spectabile, Leptalia macilenta, Trichochrous laticollis, Corphyra bivittata, Trigonurus* sp., *Amnesia granicollis,* and *Desmocerus cribripennis.*

The Lepidopterists found very little in their line.

Mr. E. T. Cresson, Jr., found many good Diptera.

Mr. Ehrhorn took a few Coccidae and Mr. Fuchs a few Pselaphides by sifting.

The day was thoroughly enjoyed by the members and the several interesting catches made them enthusiastic.

F. E. BLAISDELL, M. D.,
Secretary.

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(Notes and articles on geographical distribution are indexed under the names of the States or countries concerned, and *not* under the species listed therein, except in the case of new or redescribed forms. New generic and specific names are marked with a *.)

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I have for exchange cocoons and pupae of *P. podilarius, machaon; Sphinx ligustri, pinastri, euphorbiae, elpenor, porcellus, tiliae, occelata, populi, stellatarum; Saturnia pyri, pavonia; Aglia tau; End. versicolora, G. lanestris, Ph. bucephala, C. vinula, N Ziczac,* and eggs of *Catacola fraxini, nupta, promissa, elocata* and *electa.*—Joseph Sever, 335 E. 49th St., New York City.

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Correspondence solicited with collectors who have been victimized by foreign dealers or collectors. Correspondence confidential. Object retribution.—Address A. F. Porter, Decorah, Ia.

I have larvae of *Catocala illecta* feeding on honey-locust, and shall have chrysalids in a few weeks. From eggs of *C. piatrix* and *C. vidua* shall soon have larvae. Larvae of other later. Want *C. parta* and *C. amatrix.*—R. R. Rowley, Louisiana, Mo.

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